JP 6-71767

PAT-NO: JP406071767A

DOCUMENT-IDENTIFIER: JP 06071767 A

TITLE: MANUFACTURE APPARATUS FOR POROUS FILM

PUBN-DATE: March 15, 1994

INVENTOR-INFORMATION:
NAME
KAGAWA, SEIJI
KAGAWA, YOICHIRO

ASSIGNEE-INFORMATION:

NAME	COUNTRY
KAGAWA SEIJI	N/A

APPL-NO: JP04217624

APPL-DATE: August 17, 1992

INT-CL (IPC): B29C067/20, B26F001/18

US-CL-CURRENT: 425/4C

ABSTRACT:

PURPOSE: To provide an apparatus for manufacture of a porous film wherein many through holes or non-through holes having microsizes which are selected optionally within a range of a specific value by hardly impairing an essential characteristic of a film material for a long film 12 consisting of not only a high molecular material but also many kinds of materials.

CONSTITUTION: A supply means for supplying intermittently a long film 12, a base stand 1 through which the long film 12 passes, a press

means 9 which is
freely movably arranged so as to pressurize the long film 12 between the base
stand 1 and the film itself and of which a surface opposed to the base stand 1
many particles 10 of at least 5 Moh's hardness having a sharp corner are
attached to, and a drive means 7 for moving the press means 9 to the base stand
1 so that a grain-attached surface of the press means 9 is located at a
specific gap from a surface of the base stand 1, are provided.

(19)日本国特許庁（ＪＰ）　(12)**公開特許公報**（Ａ）　(11)特許出願公開番号

特開平6－71767

(43)公開日　平成６年(1994)３月15日

(51)Int.Cl.[5]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｂ２９Ｃ　67/20		Ａ　9268－4Ｆ		
Ｂ２６Ｆ　1/18		7411－3Ｃ		
// Ｂ２９Ｋ 105:04				
Ｂ２９Ｌ　7:00		4Ｆ		

審査請求　未請求　請求項の数７(全 15 頁)

(21)出願番号　特願平4－217624

(22)出願日　平成４年(1992)８月17日

(31)優先権主張番号　特願平4－77322

(32)優先日　平４(1992)３月31日

(33)優先権主張国　日本（ＪＰ）

(71)出願人　391009408
加川　清二
埼玉県浦和市田島８丁目15番11－301

(72)発明者　加川　清二
埼玉県川口市本町１－17－13－601

(72)発明者　加川　洋一郎
埼玉県川口市本町１－17－13－601

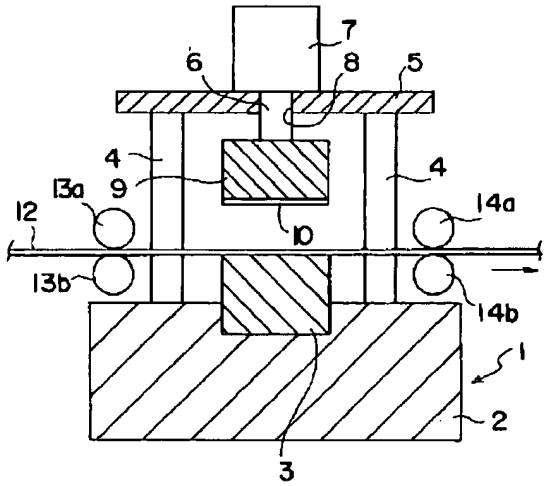
(74)代理人　弁理士　鈴江　武彦

(54)【発明の名称】　多孔質フィルムの製造装置

(57)【要約】

【目的】高分子材料を始めとして多様な材料からなる長尺フィルム１２に対してそのフィルム材料本来の特性を殆ど損なうことなくサブμｍ～十数μｍの範囲で任意に選択された微細寸法の多数の貫通孔又は未貫通孔を一様かつ高密度で形成できる多孔質フィルムの製造装置を提供する。

【構成】長尺フィルム１２を間欠的に供給するための供給手段と、前記長尺フィルム１２が通過される基台１と、前記基台１との間で前記長尺フィルム１２を加圧するように移動自在に配置され、鋭い角部を有するモース硬度５以上の多数の粒子１０が前記基台１と対向する面に付着されたプレス手段９と、前記基台１に前記プレス手段９を前記基台１表面に対して前記プレス手段９の前記粒子付着面が所望の隙間をあけて位置するように移動させるための駆動手段７とを具備したことを特徴としている。



1

【特許請求の範囲】

【請求項１】　長尺フィルムを供給するための供給手段と、

前記長尺フィルムが通過される基台と、

前記基台との間で前記長尺フィルムを加圧するように移動自在に配置され、鋭い角部を有するモース硬度５以上の多数の粒子が前記基台と対向する面に付着されたプレス手段と、

前記基台に前記プレス手段を前記基台表面に対して前記プレス手段の前記粒子付着面が所望の隙間をあけて位置するように移動させるための駆動手段とを具備したことを特徴とする多孔質フィルムの製造装置。

【請求項２】　前記モース硬度５以上の粒子は合成ダイヤモンド粒子であることを特徴とする請求項１記載の多孔質フィルムの製造装置。

【請求項３】　前記基台表面には、鋭い角部を有するモース硬度５以上の多数の粒子が付着されていることを特徴とする請求項１記載の多孔質フィルムの製造装置。

【請求項４】　長尺フィルムを供給するための供給手段と、

前記長尺フィルムが通過され、少なくとも表面が導電材料で形成されると共に前記表面に誘電体層が被覆された基台と、

前記基台との間で前記長尺フィルムを加圧するように移動自在に配置され、鋭い角部を有するモース硬度５以上の多数の誘電性粒子が前記基台と対向する面に付着された電極体を有するプレス手段と、

前記基台に前記プレス手段を移動させ、それらの間に位置する前記長尺フィルムを加圧するための駆動手段と、

前記プレス手段の前記電極体に高電圧を供給するための高電圧供給手段とを具備したことを特徴とする多孔質フィルムの製造装置。

【請求項５】　前記モース硬度５以上の誘電性粒子は合成ダイヤモンド粒子であることを特徴とする請求項４記載の多孔質フィルムの製造装置。

【請求項６】　前記誘電体層は、セラミック層であることを特徴とする請求項４記載の多孔質フィルムの製造装置。

【請求項７】　長尺フィルムを供給するための供給手段と、

前記長尺フィルムが通過される基台と、

前記基台との間で前記長尺フィルムを加圧するように移動自在に配置され、鋭い角部を有するモース硬度５以上の多数の粒子が前記基台と対向する面に付着されたプレス手段と、

前記基台に前記プレス手段を移動させ、それらの間に位置する前記長尺フィルムを加圧するための駆動手段とを具備したことを特徴とする多孔質フィルムの製造装置。

【発明の詳細な説明】

【０００１】

2

【産業上の利用分野】本発明は、多孔質フィルムの製造装置に関し、特に包装材料、衛生材料、医療材料、衣料材料等の素材として好適な多数の未貫通孔または貫通孔を有する多孔質フィルムの製造装置に係わる。

【０００２】

【従来の技術および課題】従来、この種のフィルムの製造方法としては汎用のオレフィン樹脂（例えばポリエチレン）に微細な無機物粉末を大量（通常、樹脂に対して５０体積%以上）に充填した後、フィルム化し、更に一軸又は二軸方向に高倍率で延伸することにより、前記無機物粉末との境界面に破壊孔を形成して迷路的に連通した微細な孔を開口する方法である。しかしながら、前述した従来の製造方法は次のような問題があった。

【０００３】（１）無機物粉末を大量に添加するため、フィルムを構成する樹脂本来の特性（例えば強度、ソフト感、透明性等）が著しく低下し、実質的にプラスチックライクのフィルムを得ることができない。

【０００４】（２）無機物粉末を大量に添加し、一軸又は二軸方向に高倍率で延伸する手法を採用するため、エラストマーフィルムのような伸縮性を有するフィルムに適用することができない。

【０００５】また、別の多孔質フィルムの製造方法としてはニードルパンチ法や熱溶融穿孔法のような機械的穿孔法も知られている。前記ニードルパンチ法は、熱可塑性樹脂フィルムに加熱された針を押し付けて穿孔する方法である。前記熱溶融穿孔法は、加熱されたエンボスロールにより熱可塑性樹脂フィルムを溶融して穿孔する方法である。

【０００６】しかしながら、前記機械的穿孔方法は孔の大きさが１００μｍ程度大きく、これより微細な孔を穿孔することが困難であるばかりか、前記孔を高密度（例えば１ｃｍ^2 当り５０００個以上）で穿孔することができないという問題がある。

【０００７】本発明の目的は、高分子材料、金属を始めとして多様な材料からなる長尺フィルムに対してそのフィルム材料本来の特性を殆ど損なうことなくサブμｍ～十数μｍの範囲で任意に選択された微細寸法の多数の均一な貫通孔又は未貫通孔を一様かつ高密度（１ｃｍ^2 当り５０００～２００００個）で形成できる多孔質フィルムの製造装置を提供するものである。

【０００８】本発明の目的は、高分子材料を始めとする各種の長尺有機系フィルムに対してそのフィルム材料本来の特性（例えば透明性、強度、ソフト感等）を殆ど損なうことなくサブμｍ～３００μｍの範囲で任意に選択された微細な開口幅を有し、かつ内面が親和性を示す凹部を一様かつ多数（例えば１ｃｍ^2 当り５００～２０，０００個）形成することが可能な多孔質フィルムの製造装置を提供するものである。

【０００９】本発明の目的は、長尺有機系フィルムに対してそのフィルム材料本来の特性（例えば透明性、強

度、ソフト感等）を殆ど損なうことなくサブμm～３００μmの範囲で任意に選択された微細な開口幅を有し、かつ内面が親和性を示す凹部を一様かつ多数（例えば１ｃｍ² 当り５００～２００，０００個）形成できると共に、前記凹部の底部に対応する前記フィルムの残存薄膜部に内面が親和性を示す前記開口幅より小さい径の貫通孔を形成することが可能な多孔質フィルムの製造装置を提供するものである。

【００１０】

【課題を解決するための手段】本発明に係わる多孔質フィルムの製造装置は、長尺フィルムを供給するための供給手段と、前記長尺フィルムが通過される基台と、前記基台との間で前記長尺フィルムを加圧するように移動自在に配置され、鋭い角部を有するモース硬度５以上の多数の粒子が前記基台と対向する面に付着されたプレス手段と、前記基台に前記プレス手段を前記基台表面に対して前記プレス手段の前記粒子付着面が所望の隙間をあけて位置するように移動させるための駆動手段とを具備したことを特徴とするものである。

【００１１】前記フィルムとしては、例えばポリエチレン、ポリプロピレン、ポリエチレンテレフタレート、ポリエステル、ポリ塩化ビニル、ポリエステル、フッ素樹脂、ポリアミドなどの汎用高分子材料フィルム；ポリカーボネート、ポリイミドなどのエンジニアリングプラスチックフィルム、またはポリエーテルエーテルケトン、ポリエーテルケトンなどのスーパエンジニアリングプラスチックフィルム；エラストマーフィルム、その他熱融着性樹脂フィルム、発泡紙；高分子材料にシリカ粉末、カーボン粉末、アルミナ粉末等の無機質粉末を混合させた複合フィルム；材質の異なる高分子材料フィルムを２層または３層ラミネートした積層フィルム、高分子材料フィルムに織布、不織布または紙をラミネートした積層フィルム、高分子材料フィルムにアルミニウム箔、鋼箔などの金属箔をラミネートした積層フィルム；アルミニウムフィルム、銅フィルム等の金属フィルム等を挙げることができる。なお、前記フィルムとしては、通常、３．５μm～１ｍｍの厚さのものを用いることができる。

【００１２】前記長尺フィルムを供給するための供給手段としては、例えば前記各種のフィルムを巻装したロールを用いることができる。また、前記長尺フィルムが高分子材料からなる場合には前記供給手段としてインフレーション法によるフィルム製造機、またはキャスティング法によるフィルム製造機を用いることができる。

【００１３】前記基台は、例えば鉄、鉄系合金等の各種の硬質金属から形成される。前記基台表面には、めっき技術等によりＮｉ、Ｃｒなどの金属層が形成されていてもよい。

【００１４】前記プレス手段は、例えば鉄、鉄系合金等からなる本体を有する。また、前記本体の表面にはめっき技術等によりＮｉ、Ｃｒなどの金属層が形成されていてもよい。前記本体は、最終製品（例えば脱酸素剤、乾燥剤の包装材）の寸法にすることを許容する。

【００１５】前記本体の前記基台と対向する面に鋭い角部を有する多数のモース硬度５以上の粒子を付着する方法としては、例えば電着法、または有機系もしくは無機系の結合剤による接着法等を採用することができ、特に電着法により前記粒子を前記本体に付着することが好適である。このような電着法により前記粒子を前記プレス手段の所定の面に付着する場合には、前記本体の所定の面にめっき技術等によりＮｉ層、Ｃｒ層を形成することが望ましい。

【００１６】前記モース硬度５以上の粒子としては、例えばタングテンカーバイトなどの超硬合金粒子、または炭化ケイ素粒子、炭化ホウ素粒子、サファイア粒子、立方晶窒化ホウ素（ＣＢＮ）粒子、天然又は合成のダイヤモンド粒子等を挙げることができる。特に、硬度、強度等が大きい合成ダイヤモンド粒子が望ましい。前記粒子は、粒径が１０～１００μmで粒径のばらつきが５％以下のものを用いることが望ましい。前記多数の粒子は、前記長尺フィルムに未貫通孔を高密度で形成する観点から、前記プレス本体の前記基台と対向する面に７０％以上付着させることが望ましい。前記駆動手段としては、例えばエアーシリンダ、油圧シリンダ、サーボモータを駆動源とするシリンダ等を挙げることができる。

【００１７】本発明に係わる多孔質フィルムの製造装置において、前記基台表面に前述した鋭い角部を有する多数のモース硬度５以上の粒子を電着等により付着させることを許容する。

【００１８】また、本発明に係わる別の多孔質フィルムの製造装置は、長尺フィルムを供給するための供給手段と、前記長尺フィルムが通過され、少なくとも表面が導電材料で形成されると共に前記表面に誘電体層が被覆された基台と、前記基台との間で前記長尺フィルムを加圧するように移動自在に配置され、鋭い角部を有するモース硬度５以上の多数の誘電性粒子が前記基台と対向する面に付着された電極体を有するプレス手段と、前記基台に前記プレス手段を移動させ、それらの間に位置する前記長尺フィルムを加圧するための駆動手段と、前記プレス手段の前記電極体に高電圧を供給するための高電圧供給手段とを具備したことを特徴とするものである。

【００１９】前記長尺フィルムは、絶縁材料からなるものであれば、いかなるものでよい。具体的には、ポリエチレン、ポリプロピレンなどのポリオレフィンフィルム、ポリエステルフィルム、エラストマーフィルム等の各種の高分子材料フィルム；発泡ポリエチレン、発泡ポリプロピレンなどの各種の発泡高分子材料フィルム；高分子材料にシリカ粉末、カーボン粉末、アルミナ粉末等の無機質粉末を混合させた複合フィルム；材質の異なる高分子材料フィルムを２層または３層ラミネートした積

層フィルム、高分子材料フィルムに織布または不織布をラミネートした積層フィルム、高分子材料フィルムに紙をラミネートした積層フィルムなどの各種の積層フィルム等を用いることができる。また、前記フィルムとしては通常、数μm～5mmの厚さのものを用いることができる。前記長尺フィルム供給手段は、前述したのと同様な構造をのものを用いることができる。

【0020】前記基台は、少なくとも表面が導電材料で形成されていることが必要である。かかる基台としては、例えば鉄または鉄系合金等の各種の金属からから形成される。また、前記基体を金属または絶縁材料から形成し、その表面にめっき技術等によりNi層、Cr層を被覆して少なくとも表面を導電材料で形成してもよい。

【0021】前記基台表面に被覆された誘電体層としては、例えばシリコーンゴムまたはアルミナ、ジルコニア、ムライト、窒化ケイ素などの絶縁性セラミック等から形成される。特に、前記絶縁性セラミックは耐高電圧特性、強度が優れているために好適である。前記誘電体層の厚さは、2～5mm程度にすることが望ましい。前記セラミック層を前記基台表面に被覆するには、例えば溶射法が採用され、前記基台表面に前記セラミック層を溶射により被覆した後は、前記セラミック層表面を研摩処理を施して平滑にすることが望ましい。

【0022】前記プレス手段は、例えば金属材料からなる本体と、前記本体の前記基台側に対向する面に固定された絶縁板と、前記絶縁板に固定され、前記基台側の面に前記多数のモース硬度5以上の導電性粒子が付着された前記電極体とを備えた構造を有する。

【0023】前記本体は、例えば鉄、鉄系合金等の金属材料から形成される。また、前記本体の表面にはめっき技術等によりNi、Crなどの金属層が形成されていてもよい。

【0024】前記絶縁板は、例えば高分子材料、セラミック等を用いることができる。特に、耐高電圧特性、強度の優れたポリカーボネート樹脂等のエンジニアリングプラスチックが好適である。

【0025】前記電極体は、例えば銅および銅合金、または鉄および鉄合金、あるいはこれらの金属表面にニッケルめっき層、クロムめっき層を被覆したもの等から形成される。前記電極体は、最終製品（例えば脱酸素剤用包装材）の寸法にすることを許容する。

【0026】前記電極体は、例えば前記多数の導電性粒子が付着される面が平坦である形状を有する。また、前記有機系フィルムが最終製品寸法で、曲面形状を有する場合には前記電極体の前記面を前記フィルム形状に対応して曲面にすることを許容する。このような形状の電極体を用いる場合には、前記基台の受板を前記電極体の曲面に合致するように曲面形状にする。

【0027】前記電極体の前記基台と対向する面に付着される前記モース硬度5以上の誘電性粒子としては、例

えば炭化ケイ素粒子、天然又は合成のダイヤモンド粒子（誘電率；5．7）等を挙げることができる。特に、合成ダイヤモンド粒子は硬度、強度等が大きく、かつ高い絶縁耐圧（3．5×10^6 V／cm）を有する上、粒径の揃ったものが入手できるために好適である。前記誘電性粒子は、粒径が10～100μmで粒径のばらつきが5%以下のものを用いることが望ましい。前記多数の粒子は、フィルムに貫通孔を高密度で形成する観点から、前記プレス手段の前記基台と対向する面に70%以上付着させることが望ましい。

【0028】また、前記プレス手段は絶縁材料からなる本体と、前記本体に固定され、前記基台側の面に前記多数の導電性粒子が付着された前記電極体とを備えた構造を有することを許容する。

【0029】前記駆動手段としては、例えばエアーシリンダ、油圧シリンダ、サーボモータを駆動源とするシリンダ等を挙げることができる。前記駆動手段による前記プレス手段の移動は、前記プレス手段の前記電極体の面に付着された前記多数の導電性粒子の鋭い角部が前記基台の前記誘電体層表面と所望の隙間をあけて対向するように行うことが望ましい。

【0030】前記高電圧供給手段は、前記プレス手段が前述したように導電材料からなる本体、絶縁板および多数の導電性粒子が付着された電極体から構成される場合、次のような構造にすることが望ましい。すなわち、前記基台と反対側の前記本体の面から前記本体および前記絶縁板を貫通して挿着された絶縁筒体と、前記絶縁筒体に先端が前記電極体に接触するように挿着された高電圧供給端子と、前記供給端子に接続された高電圧供給源（例えば交流電源または直流電源）とから前記高電圧供給手段を構成することが望ましい。特に、前記高電圧供給端子と前記高電圧供給源との接続経路にさらに前記電極体に供給する高電圧を制御するための制御部材を設けることが望ましい。前記絶縁筒体は、例えば高分子材料、セラミック等から形成される。中でも、耐高電圧特性、強度の優れたポリカーボネート樹脂等のエンジニアリングプラスチックが好適である。

【0031】更に、本発明に係わる別の多孔質フィルムの製造装置は長尺フィルムを供給するための供給手段と、前記長尺フィルムが通過される基台と、前記基台との間で前記長尺フィルムを加圧するように移動自在に配置され、鋭い角部を有するモース硬度5以上の多数の粒子が前記基台と対向する面に付着されたプレス手段と、前記基台に前記プレス手段を移動させ、それらの間に位置する前記長尺フィルムを加圧するための駆動手段とを具備したことを特徴とするものである。前記長尺フィルムとしては、例えば前述した各種の高分子材料フィルム、積層フィルム、金属フィルム等を挙げることができる。前記長尺フィルム供給手段は、前述したのと同様な構造をのものを用いることができる。

【００３２】前記基台は、例えば鉄、鉄系合金等の各種の硬質金属から形成される。また、前記基台表面には緩衝層が被覆されることを許容する。前記緩衝層としては、各種の高分子材料から形成されるが、特に前記長尺フィルムに対する緩衝作用の高いウレタン樹脂、シリコンゴム等が好適である。このような緩衝層を前記基台表面に被覆することによって、前記長尺フィルムに揃った寸法の貫通孔を穿孔することが可能になる。

【００３３】前記プレス手段は、例えば鉄、鉄系合金等からなる本体を有する。また、前記本体の表面にはめっき技術等によりＮｉ、Ｃｒなどの金属層が形成されていてもよい。前記本体は、最終製品（例えば脱酸素剤、乾燥剤の包装材、使い捨てカイロの包装材）の寸法にすることを許容する。前記モース硬度５以上の粒子としては、前述したのと同様なものを用いることができる。前記駆動手段としては、例えばエアーシリンダ、油圧シリンダ、サーボモータを駆動源とするシリンダ等を挙げることができる。

【００３４】

【作用】本発明に係わる多孔質フィルムの製造装置によれば、長尺フィルムを供給するための供給手段と、前記長尺フィルムが通過される基台と、前記基台との間で前記長尺フィルムを加圧するように移動自在に配置され、鋭い角部を有するモース硬度５以上の多数の粒子が前記基台と対向する面に付着されたプレス手段と、前記基台に前記プレス手段を前記基台表面に対して前記プレス手段の前記粒子付着面が所望の隙間をあけて位置するように移動させるための駆動手段とを具備することによって、高分子材料、金属を始めとして多様な材料からなる長尺フィルムに対してそのフィルム材料本来の特性（例えば高分子材料フィルムの場合はソフト感や透明性等）を殆ど損なうことなくサブμｍ～十数μｍの多数の均一な未貫通孔を一様かつ高密度（１ｃｍ² 当り５０００～２００００個）で連続的に形成できる。

【００３５】すなわち、前記駆動手段により前記プレス手段を前記基台に前記基台表面に対して前記プレス手段が所望の隙間をあけて位置するように移動させ、前記プレス手段と前記基台との間に位置される前記長尺フィルムを加圧する。前記プレス手段の前記基台と対向する面には鋭い角部を有するモース硬度５以上の多数の粒子（例えば合成ダイヤモンド粒子）が付着されているため、前記多数の合成ダイヤモンド粒子の鋭い角部が前記フィルムに一定深さ食い込んで機械的な穿孔がなされる。その結果、前記長尺フィルムに前記隙間に相当する超薄膜部分が残存した多数の未貫通孔を一様に形成することができる。具体的には、サブμｍ～十数μｍの範囲で任意に選択された微細寸法の未貫通孔を一様かつ高密度（１ｃｍ² 当り５０００～２００００個）で形成できる。しかも、前記穿孔操作は前記プレス手段に付着された合成ダイヤモンド粒子による機械的な力によりなされるため、前記フィルム材料本来の特性を殆ど損なうことなくを、前記長尺フィルムに微細寸法の多数の均一な未貫通孔を形成できる。このような穿孔操作を行った後、前記駆動手段により前記プレス手段を前記基台から離れるように移動させ、前記長尺フィルムを前記プレス手段の幅（前記長尺フィルムの移動方向に沿う辺の長さ）に相当する長さ移動させ、再度、同様な穿孔操作を行う。

【００３６】以上のような製造装置による穿孔操作を以下に説明する材料または構造の長尺フィルムに適用することによって、種々の用途の多孔質フィルムを得ることができる。

【００３７】（１）二軸遠心ポリプロピレンフィルム、キャスティングポリプロピレンフィルムなどのポリプロピレンフィルム、ポリエチレンフィルム、ポリエチレンテレフタレートフィルム等の高分子材料フィルムに微細な未貫通孔を多数かつ一様に穿孔することによって、透液性は有さないものの、前記未貫通孔に対応する残存超薄膜部分による酸素ガス透過性、炭酸ガス透過性、水蒸気透過性を示す機能性フィルムを得ることができる。

【００３８】具体的には、青果物鮮度保持用機能性包装材に利用できる。すなわち、青果物を密封包装した場合、青果物自身の呼吸作用により包装材内の酸素濃度が減少して炭酸ガス濃度が増加し、低酸素、高二酸化炭素の条件が加わって呼吸が抑制され、青果物の鮮度保持がなされる。この場合、前記包装材の素材であるフィルムのガス透過性は個々の青果物が正常に呼吸して生命体を維持できる最低限度の酸素を透過すること、呼吸によって生成した炭酸ガス濃度も過剰にならないように制御されること、細菌繁殖の原因となる結露が生じないこと等が要求される。

【００３９】前記多孔質高分子材料フィルムは、高分子材料フィルムに微細な未貫通孔を多数かつ一様に穿孔され、前記未貫通孔に対応する残存超薄膜部分においてフィルム素材の持つガスの溶解、拡散による酸素、炭酸ガス、水蒸気の透過量が大幅に増大する。このため、前記多孔質高分子材料フィルムから作製された包装材は優れた青果物鮮度保持作用を有する。

【００４０】（２）例えばポリエチレンまたはポリプロピレンからなる第１のフィルムに例えばポリエチレンテレフタレートからなる第２のフィルムを積層した長尺積層フィルムを用い、前記長尺積層フィルムの第２フィルム側から前記第１フィルムに亘って微細な未貫通孔を多数かつ一様に穿孔して多孔質積層フィルムを製造する。ただし、前記第２フィルムには貫通孔が形成される。このような多孔質積層フィルムは、耐水圧性（耐透水性）が高く、酸素、水蒸気透過性を有する低価格の乾燥剤用包装材、脱酸素剤用包装材として好適に利用できる。

【００４１】すなわち、従来の脱酸素剤用包装材はポリエチレンテレフタレートフィルム、ポリエチレンフィル

ムの二層フィルムにニードルパンチ法等により多数の貫通孔を穿設し、前記二層フィルムのポリエチレンフィルム側に和紙を積層した構造になっているため、和紙を積層する分、価格が高くなる。また、液状の内容物と共に密閉容器に収納すると、前記内容物が前記貫通孔、和紙の孔を通して内部に侵入してその中に収納した脱酸素剤を劣化させるという問題がある。

【００４２】前記多孔質積層フィルムを用いて残存超薄膜部を有する前記第１フィルムが内側になるように袋状にして脱酸素剤用包装材を作製すると、外界の酸素は前記第２フィルムの多数の貫通孔を通り、さらに前記第１フィルムの未貫通孔に対応する残存超薄膜部分においてフィルム素材の持つガスの溶解、拡散により酸素が透過する。また、前記残存超薄膜部分の厚さや貫通孔の数を調節することによって、前記酸素透過量を増減させることができる。したがって、前記包装材に脱酸素剤を収納し、ガスバリア性の高い密閉容器に菓子等の内容物と共に装填すると、前記容器内の酸素が前記包装材を透過して前記脱酸素剤に吸収されるため、前記容器内を酸素が存在しない状態にでき、前記内容物の酸化に伴う品質劣化を防止できる。しかも、前記包装材は高い耐透水性を有するため、前記内容物が液体であっても前記内容物が前記包装材を通して内部に侵入してその中の脱酸素剤を劣化させるのを防止することができる。その結果、数種類の包装材を用意するだけで、液体状、固体状の内容物の長期間保存することができる。

【００４３】また、前記積層複合フィルムを用いて多数の未貫通孔を有する前記第１フィルムが内側になるように袋状にして乾燥剤用包装材を作製すると、外界の水蒸気は前記第２フィルムの多数の貫通孔を通り、さらに前記第１フィルムの未貫通孔に対応する残存超薄膜部分においてフィルム素材の持つガスの溶解、拡散により水蒸気が透過する。したがって、前記包装材に乾燥剤を収納し、ガスバリア性の高い密閉容器に菓子等の内容物と共に装填すると、前記容器内の水蒸気が前記包装材を透過して前記乾燥剤に吸収されるため、前記容器内を乾燥状態にでき、前記内容物の湿気による品質劣化を防止できる。

【００４４】（３）微細な未貫通孔を多数かつ一様に穿孔された汎用高分子材料からなる多孔質フィルムに樹脂溶液やインクを塗布して乾燥すると、前記フィルムの多数の未貫通孔の投錨作用により前記フィルムに対して密着性の優れた薄膜が被覆されたラミネートフィルムを形成できる。

【００４５】また、表面に鋭い角部を有するモース硬度５以上の多数の粒子（例えば合成ダイヤモンド粒子）が付着された基台を用いることによって、前記長尺フィルムの表面側および裏面側から未貫通孔を穿孔することができる。すなわち、前記プレス手段を前記基台に前記基台表面に対して前記プレス手段が所望の隙間をあけて位置するように駆動手段により移動させ、前記プレス手段と前記基台との間に位置される前記長尺フィルムを加圧すると、前記プレス手段の前記基台と対向する面に付着された鋭い角部を有するモース硬度５以上の多数の粒子（例えば合成ダイヤモンド粒子）が前記フィルムに一定深さ食い込むと共に、前記基台側の前記合成ダイヤモンド粒子の角部が前記フィルムに一定深さ食い込で機械的な穿孔がなされる。その結果、前記長尺フィルムに前記隙間に相当する超薄膜部分が裏面側に残存した多数の未貫通孔、および前記隙間に相当する超薄膜部分が表面側に残存した多数の未貫通孔を一様に形成することができる。したがって、前記プレス手段の基台対向面側のみに多数の前記合成ダイヤモンド粒子を付着させた製造装置により穿孔する場合に比べて微細寸法の未貫通孔を著しく高密度で形成できる。

【００４６】さらに、最終製品（例えば脱酸素剤、乾燥剤の包装材）の寸法を有する比較的小寸法のプレス手段を用いて前述した穿孔操作を行うと、前記プレス手段の面精度を高めることができ、前記長尺フィルムの加圧時における前記基台と前記プレス手段との対向距離（隙間）を著しく高精度で設定できるため、前記長尺フィルムに深さ（残存超薄膜部分の厚さ）が揃った多数の未貫通孔を再現性よく穿孔することができる。したがって、このような穿孔操作を前記（２）で説明した長尺積層フィルムに対して適用することによって、極めて高品質の脱酸素剤用包装材、乾燥剤用包装材に利用できる多孔質積層フィルムを得ることができる。

【００４７】さらに、本発明に係わる多孔質イルムの製造装置において前記プレス手段として前記合成ダイヤモンド粒子が付着された面が最終製品寸法を有するフィルム（例えば合成皮革と不織布の積層体からなる靴の半製品）に対応した曲面形状を有する本体を備えたものを用い、かつ前記基台として前記プレス手段の前記本体の曲面と合致する形状を有するものを用いれば、透湿性等を有する最終製品寸法の多孔質フィルムを製造することができる。

【００４８】また、本発明に係わる多孔質フィルムの製造装置によれば長尺フィルムを供給するための供給手段と、前記長尺フィルムが通過され、少なくとも表面が導電材料で形成されると共に前記表面に誘電体層が被覆された基台と、前記基台との間で前記長尺フィルムを加圧するように移動自在に配置され、鋭い角部を有するモース硬度５以上の多数の誘電性粒子が前記基台と対向する面に付着された電極体を有するプレス手段と、前記基台に前記プレス手段を移動させ、それらの間に位置する前記長尺フィルムを加圧するための駆動手段と、前記プレス手段の前記電極体に高電圧を供給するための高電圧供給手段とを具備することによって、高分子材料を始めとして多様な有機系材料からなる長尺フィルムに対してそのフィルム材料本来の特性（例えば透明性、強度、ソフ

ト感等）を殆ど損なうことなくサブμm～300μmの範囲で任意に選択された微細な開口幅を有し、かつ内面が親和性を示す凹部を一様かつ多数（例えば1cm² 当り500～200，000個）形成することができる。

【0049】すなわち、前記駆動手段により前記プレス手段を表面に誘電体層が被覆された前記基台に移動させ、前記プレス手段の電極体と前記基台との間に供給された前記長尺フィルム（例えば長尺有機系フィルム）を加圧すると、前記電極体の前記基台と対向する面に付着された多数の合成ダイヤモンド粒子の鋭い角部が前記フィルムに一様に食い込んで機械的な穿孔がなされ、前記フィルム本来の特性（例えば透明性、強度、ソフト感等）を損なうことなく、微細な開口幅を有する例えば逆円錐形状の凹部が多数形成される。同時に、前記高電圧供給手段から高電圧を前記プレス手段の前記電極体に供給すると、前記電極体は前記長尺有機系フィルムを挟んで表面に前記誘電体層が被覆された前記基台と対向されているため、前記電極体に付着された誘電体（誘電率；5．7）である多数の合成ダイヤモンド粒子と前記基台の誘電体層の間でコロナ放電が一様に発生する。このようなコロナ放電において、前記高電圧供給手段からの比較的低い高電圧を前記合成ダイヤモンド粒子に供給すると、前記合成ダイヤモンド粒子が食い込まれた前記長尺有機系フィルムに比較的エネルギーの低いコロナが一様に照射されるため、前記長尺有機系フィルムに穿孔された多数の凹部の内面が前記コロナ放電により親和化処理される。

【0050】一方、前記高電圧供給手段から比較的高い高電圧を前記電極体に供給すると、前記多数の合成ダイヤモンド粒子の角部における放電集中、つまりエッジ効果により前記多数の合成ダイヤモンド粒子が食い込まれた前記長尺有機系フィルムに形成された前記凹部の底部に位置する残存薄膜部に高エネルギーのコロナが主に集中して照射されて穿孔がなされる。このため、前記残存薄膜部に前記凹部の開口幅より小さい径の例えば円柱形状の貫通孔が形成される。また、前記長尺有機系フィルムに穿孔された多数の凹部の内面および前記貫通孔の内面は前記コロナ放電により親和化処理される。

【0051】このような穿孔およびコロナ放電処理を行った後、前記駆動手段により前記プレス手段を前記基台から離れるように移動させ、前記長尺有機系フィルムを前記プレス手段の幅（前記長尺フィルムの移動方向に沿う辺の長さ）に相当する長さ移動させ、再度、同様な穿孔およびコロナ放電処理を行う。

【0052】以上のような製造装置によれば、有機系フィルムに対してそのフィルム材料本来の特性（例えば透明性、強度、ソフト感等）を殆ど損なうことなくサブμm～300μmの範囲で任意に選択された微細な開口幅を有し、かつ内面が親和性を示す凹部を一様かつ多数（例えば1cm² 当り500～200，000個）形成できるため、優れた濡れ性を有し、水、細菌、雑菌を透過せず、酸素ガス、炭酸ガスなどのガスや水蒸気を透過してガス透過量、水蒸気透過量の制御性等を有する多孔質フィルムを製造することができる。このような多孔質フィルムは、次に説明する塗布膜形成用ベースフィルム、積層用フィルムまたは青果物鮮度保持用包装材、脱酸素剤用包装材などの各種包装材、はっぷ剤の伸縮性ベースフィルム、手術用の手袋等に有効に利用できる。

【0053】すなわち、前記多孔質フィルムは、内面が親和性を示す多数の凹部が形成されているため、前記凹部が存在しない有機系フィルムに比べて濡れ性が著しく改善される。また、前記多孔質フィルムは多数の微細な凹部が形成されているため、前記多数の凹部の開口側に接着剤層等を塗布すると、前記多数の凹部の個所で前記接着剤層等に対して優れたアンカー効果を示す。このような前記多孔質フィルムは、次に説明する塗布膜形成用ベースフィルム、積層用フィルムとして利用することができる。

【0054】（1）前記多孔質フィルムの多数の凹部の開口部側の面に磁性粉末を含む樹脂溶液を塗布し、乾燥することによって、前記多孔質フィルムの前記多数の微細な凹部における濡れ性およびアンカー効果により前記多孔質フィルムに対して密着性の優れた磁性層を被覆することができる。したがって、前記磁性層が被覆された多孔質フィルムは、磁気フィルムとして利用することができる。特に、前記多孔質フィルムの多数の凹部内に前記磁性粉末を埋没させることができるため、前記磁性層の厚さを薄くしても前記磁性粉末の充填密度を向上できる。その結果、高密度記録が可能な例えばプリペイドカードのような薄い磁気フィルムを得ることが可能になる。

【0055】（2）前記多孔質フィルムの多数の凹部の開口部側の面にインクを塗布し、乾燥することにより前記多孔質フィルムの多数の微細な凹部の濡れ性およびアンカー効果により前記多孔質フィルムに対して密着性の優れたインク層を被覆することができる。したがって、前記インク層が被覆された多孔質フィルムは、インクリボンとして利用することができる。特に、前記多孔質フィルムの多数の凹部内にも前記インクを充填させることができるため、前記インク層の厚さを薄くしても前記インクの塗布量を向上できる。その結果、良好な印字記録が可能で、薄いインクリボンを得ることが可能になる。

【0056】（3）所定の接着剤を用いて前記接着剤と相溶しない有機系フィルム（第1有機系フィルム）と前記接着剤と相溶する有機系フィルム（第2有機系フィルム）を積層する際、前記第1有機系フィルムに多数の微細な凹部を形成して多孔質フィルムとし、前記多孔質フィルムの凹部の開口部側の面に前記接着剤を塗布し、この接着剤に前記第2有機系フィルムを接着して積層する。このような積層において、前記多孔質フィルムはそ

の多数の微細な凹部の濡れ性およびアンカー効果により前記接着剤が良好に接着される。一方、前記第２有機系フィルムは前記接着剤に対して相溶性を有する。その結果、前記第１、第２有機系フィルムが前記接着剤により良好に接着された積層フィルムを得ることができる。

【００５７】また、前記多孔質フィルムは前記有機系フィルムに微細な開口幅を有し、かつ内面が親和性を示す凹部が多数形成されているため、前記多数の凹部底部に対応する前記フィルムの残存薄膜部において水、細菌、雑菌を透過せず、酸素ガス、炭酸ガスなどのガスや水蒸気を透過して前記ガス透過量、水蒸気透過量を制御することができる。具体的には、前記有機系フィルムの残存薄膜部においてフィルム素材の持つガスの溶解、拡散が起こるため、酸素ガス、炭酸ガスの透過量が大幅に増大される。また、水蒸気は前記有機系フィルムの多数の微細かつ内面が親和性を示す凹部に付着し、前記凹部底部の前記残存薄膜部においてフィルム素材の持つ水蒸気の拡散が起こるため、水蒸気の透過量が大幅に増大される。このため、前記凹部の開口幅およびその数やそれら凹部に対応する前記残存薄膜部の厚さを制御することにより、前記酸素ガス、炭酸ガスの透過量や水蒸気の透過量が制御された機能性を有する多孔質フィルムが得られる。前記多孔質フィルムの酸素ガス透過量は、例えば10^3～10^7 ｃｃ／m^2・２４ｈｒ・２５℃を有する。このような機能性を有する多孔質フィルムは、次に説明する包装材に応用することができる。

【００５８】（１）例えばポリエチレンフィルム、二軸延伸ポリプロピレンフィルム、ポリプロピレンフィルム、ポリエチレンテレフタレートフィルム等からなる有機系フィルムに多数の微細かつ内面が親和性を有する凹部を形成した多孔質フィルムは、青果物鮮度保持用包装材に利用できる。

【００５９】すなわち、青果物を密封包装した場合、青果物自身の呼吸作用により包装材内の酸素濃度が減少して炭酸ガス濃度が増加する。このため、酸素量の低下と二酸化炭素の高濃度化によつて前記青果物の呼吸が抑制され、前記青果物の鮮度保持がなされる。この場合、前記包装材の素材であるフィルムは個々の青果物が正常に呼吸して生命体を維持できる最低限度の酸素を透過すること、呼吸によって生成した炭酸ガス濃度も過剰にならないように制御されること、細菌繁殖の原因となる結露を招く水蒸気を透過すること、等が要求される。

【００６０】例えばポリプロピレンフィルムに多数の微細かつ内面が親和性を示す凹部が形成して前記多孔質フィルムを作製すると、前述したように酸素ガスおよび炭酸ガスの透過量が大幅に増大されると共に、水蒸気の透過量が増大され、かつ水、雑菌の透過が防止される。したがって、前記多孔質フィルムから形成された包装材は、酸素ガスを透過でき、かつ前記青果物の呼吸によって生成した炭酸ガスを透過して炭酸ガス濃度が過剰になるのを抑制でき、さらに結露の原因となる水蒸気を透過することができる。その結果、前記多孔質フィルムからなる包装材は優れた青果物鮮度保持作用を有する。

【００６１】（２）例えばポリエチレンまたはポリプロピレンからなる第１のフィルムと例えばポリエチレンテレフタレートからなる第２のフィルムとを積層した積層フィルムに多数の微細かつ内面が親和性を示す凹部を前記第２フィルム側から前記第１フィルムに亘って形成した多孔質フィルムは、低価格の脱酸素剤用包装材として利用できる。なお、前記多孔質フィルムに形成された凹部は、前記第２フィルム部分において貫通部となる。

【００６２】すなわち、従来の脱酸素剤用包装材はポリエチレンテレフタレートフィルム、ポリエチレンフィルムの二層フィルムにニードルパンチ法等により多数の貫通孔を穿設し、前記二層フィルムのポリエチレンフィルム側に和紙を積層した構造になっている。このため、前記和紙を積層する分、価格が高くなる。また、前記包装材に脱酸素剤を収納し、前記包装材を液状の内容物と共に密閉容器に収納すると、前記内容物が前記包装材の貫通孔および和紙の孔を通して内部に侵入する。その結果、前記包装材中に収納した脱酸素剤を劣化させるという問題がある。

【００６３】前記多孔質フィルムを、前記残存薄膜部を有する前記第１フィルムが内側になるように袋状にして脱酸素剤用包装材を作製する。このような包装材は、外部の酸素が前記第２フィルムの多数の貫通部を通り、さらに前記第１フィルムの凹部に対応する残存薄膜部においてフィルム素材の持つガスの溶解、拡散により透過する特性を有する。

【００６４】したがって、前記包装材に脱酸素剤を収納し、前記包装材をガスバリア性の高い密閉容器に菓子等の内容物と共に装填すると、前記容器内の酸素は前記包装材を透過して前記脱酸素剤に吸収される。その結果、前記容器内の雰囲気を酸素が殆ど存在しない状態にできるため、前記内容物の酸化に伴う品質劣化を防止できる。

【００６５】また、前記包装材は高い耐透水性を有するため、前記内容物が液体であっても前記内容物が前記包装材を通して内部に侵入して、その中の脱酸素剤を劣化させるのを防止することができる。その結果、数種類の包装材を用意するだけで、液体状、固体状の内容物を長期間保存することができる。

【００６６】（３）前記多孔質フィルムは、前記凹部の開口幅、その数および前記残存薄膜部の厚さを制御することにより、酸素ガスおよび炭酸ガスの透過量を制御できるため、酸素ガスフィルタまたは炭酸ガスフィルタとして利用することができる。

（４）有機系フィルム、例えばエラストマーフィルムに多数の微細かつ内面が親和性を示す凹部を形成した多孔質フィルムは、はっぷ剤の伸縮性ベースフィルムに利用

できる。

【0067】すなわち、はっぷ剤は皮膚に貼り付けて消炎または分泌物吸収の目的で用いられる。前記はっぷ剤としては、従来より粉末薬品を含むペースト状外用剤を布に塗布した構造のものが知られている。しかしながら、このような構造のはっぷ剤は前記布が水蒸気を十分に透過しない。このため、前記はっぷ剤を寝眠時に皮膚に貼り付けて使用すると、皮膚から発生した汗が前記はっぷ剤を透過せずにそのまま滞留して不快感を与える。

【0068】前記多孔質フィルムに外用剤を塗布したはっぷ剤は、前記多孔質フィルムが高い水蒸気透過性を有する。このため、前記はっぷ剤は皮膚から発生した汗を透過して良好に揮散でき、寝眠時でも良好に使用することができる。

【0069】（5）前記（4）で説明したエラストマーフィルムに多数の微細な凹部を形成した多孔質フィルムは、水、細菌、雑菌を透過せず、水蒸気の透過量を増大でき、さらに高い伸縮性を有する。このため、手術用の手袋として利用することができる。

【0070】また、前述した製造装置によれば、長尺フィルムに対してそのフィルム材料本来の特性（例えば透明性、強度、ソフト感等）を殆ど損なうことなくサブμm～300μmの範囲で任意に選択された微細な開口幅を有し、かつ内面が親和性を示す凹部を一様かつ多数（例えば1cm² 当り500～200，000個）で形成できると共に、前記凹部底部に位置する前記フィルムの残存薄膜部に前記開口幅に比べて小さい径を有し、かつ内面が親和性を示す貫通孔を穿孔できるため、優れた濡れ性を有し、かつ水、細菌、雑菌を透過を抑制ないし防止し、酸素ガス、炭酸ガスなどのガスや水蒸気を透過してガス透過量、水蒸気透過量の制御性等を有する多孔質フィルムを製造することができる。このような多孔質フィルムは、前述した塗布膜形成用ベースフィルム、積層用フィルムまたは青果物鮮度保持用包装材、脱酸素剤用包装材などの各種包装材、はっぷ剤の伸縮性ベースフィルム、手術用の手袋等に有効に利用できる。

【0071】特に、青果物鮮度保持用包装材として使用されるポリエチレンフィルム、二軸延伸ポリプロピレンフィルム、ポリプロピレンフィルム、ポリエチレンテレフタレートフィルム（OPPフィルム）などは、本来的にエラストマーフィルムやポリウレタンフィルムに比べて水蒸気透過量が極端に少ない。このような有機系フィルムに本発明に係わる製造装置により穿孔およびコロナ放電処理を施して前記フィルムに親和性をそれぞれ示す多数の微細な凹部および前記凹部底部に繋がる貫通孔を形成することによって、接触された水蒸気を前記有機系フィルムの多数の微細かつ内面が親和性を示す凹部に付着し、前記残存薄膜部に穿孔された前記内面が親和性を示す貫通孔を通して拡散するため水蒸気の透過量を大幅に増大された多孔質フィルムを製造できる。例えば、二軸延伸ポリプロピレンフィルムに前記凹部、貫通孔を形成した多孔質フィルムは未処理の二軸延伸ポリプロピレンフィルムに比べて水蒸気透過量が3桁程度増大される。その結果、前記多孔質フィルムは、水蒸気による曇りおよび結露の発生を効果的に防止することが可能な青果物鮮度保持用包装材として有効に利用することができる。

【0072】さらに、前記多孔質フィルムにおいて前記凹部の開口幅、それら凹部の数、前記凹部底部に位置する前記フィルムの残存薄膜部部の厚さや前記残存薄膜部に形成される貫通孔（例えば円柱形状の貫通孔）の径、とりわけ前記残存薄膜部部の厚さおよび前記貫通孔の径、を制御することにより、前記貫通孔を透過しようとするガスの平均自由行程を制御できる。その結果、例えば空気中の酸素ガスのみを選択的に透過する酸素ガスフィルタ、または炭酸ガスのみを選択的に透過する炭酸ガスフィルタ等として利用することができる。

【0073】さらに、本発明に係わる多孔質イルムの製造装置において最終製品（例えば脱酸素剤、乾燥剤の包装材）の寸法を有する比較的小寸法の電極体を有するプレス手段を用いて前述した穿孔およびコロナ放電処理の操作を行うと、前記プレス手段の前記電極体における前記多数の合成ダイヤモンド粒子が付着された面の平滑精度を高めることができる。その結果、前記有機系フィルムの加圧時における前記基台の誘電体層と前記プレス手段の前記電極体との対向距離（隙間）を著しく高精度で設定できるため、前記有機系フィルムに深さが揃った多数の凹部を再現性よく穿孔することができると共に前記凹部の内面を良好に親和化処理することができ。したがって、このような穿孔およびコロナ放電処理の操作を前述した（2）で説明した積層フィルムに対して適用することによって、極めて高品質の脱酸素剤用包装材、乾燥剤用包装材に利用できる多孔質積層フィルムを得ることができる。

【0074】さらに、本発明に係わる多孔質フィルムの製造装置において前記プレス手段として電着により硬度、強度の高い多数の天然もしくは合成のダイヤモンド粒子を付着した電極体を備えた構造にすれば、前記長尺有機系フィルムへの穿孔およびコロナ放電処理を長期間に亘って安定的に行うことができる。しかも、前記多数の天然もしくは合成のダイヤモンド粒子を前記電極体に強固に密着できるため、耐久性の優れたプレス手段を実現できる。特に、前記電極体を前記基台と対向する面にNiめっき層が被覆された良電気導電性の銅または銅合金から形成すれば、前記天然もしくは合成のダイヤモンド粒子を前記電極体により一層強固に電着でき、著しく耐久性の優れたプレス手段を実現できる。

【0075】さらに、本発明に係わる多孔質イルムの製造装置において前記プレス手段として前記合成ダイヤモンド粒子が付着された面が最終製品寸法を有する有機系

フィルム（例えば合成皮革と不織布の積層体からなる靴の半製品）に対応した曲面形状を有する電極体を備えたものを用い、かつ前記基台として前記プレス手段の電極体の曲面と合致する形状を有するものを用いれば、透湿性を有する最終製品寸法の多孔質フィルムを製造することができる。

【００７６】さらに、本発明に係わる別の多孔質フィルムの製造装置によれば、長尺フィルムを供給するための供給手段と、前記長尺フィルムが通過される基台と、前記基台との間で前記長尺フィルムを加圧するように移動自在に配置され、鋭い角部を有するモース硬度５以上の多数の粒子が前記基台と対向する面に付着されたプレス手段と、前記基台に前記プレス手段を移動させるための駆動手段とを具備することによって、高分子材料、金属を始めとして多様な材料からなる長尺フィルムに対してそのフィルム材料本来の特性を殆ど損なうことなくサブμｍ～十数μｍの多数の均一な貫通孔を一様かつ高密度（１ｃｍ^2 当り５０００～２００００個）で連続的に形成できる。

【００７７】すなわち、前記駆動手段により前記プレス手段を前記基台に移動させ、前記プレス手段と前記基台との間に位置される前記長尺フィルムを所望の圧力で加圧する。前記プレス手段の前記基台と対向する面には鋭い角部を有するモース硬度５以上の多数の粒子（例えば合成ダイヤモンド粒子）が付着されているため、前記多数の合成ダイヤモンド粒子の鋭い角部が前記フィルムに食い込んで機械的な穿孔がなされる。この時、前記基台表面にシリコンゴムなどからなる緩衝層を被覆することによって多数の合成ダイヤモンド粒子の鋭い角部が前記フィルムを貫通して機械的な穿孔がなされる。その結果、前記長尺フィルムに未貫通孔を一様に形成することができる。具体的には、サブμｍ～十数μｍの範囲で任意に選択された微細寸法の貫通孔を一様かつ高密度（１ｃｍ^2 当り５０００～２００００個）で形成できる。しかも、前記穿孔操作は前記プレス手段に付着された合成ダイヤモンド粒子による機械的な力によりなされるため、前記フィルム材料本来の特性を殆ど損なうことなくを、前記長尺フィルムに微細寸法の多数の均一な未貫通孔を形成できる。このような穿孔操作を行った後、前記駆動手段により前記プレス手段を前記基台から離れるように移動させ、前記長尺フィルムを前記プレス手段の幅（前記長尺フィルムの移動方向に沿う辺の長さ）に相当する長さ移動させ、再度、同様な穿孔操作を行う。

【００７８】したがって、本発明の製造装置により高分子材料フィルムや積層フィルムにサブμｍ～十数μｍの範囲で任意に選択された微細寸法の貫通孔を一様かつ高密度（１ｃｍ^2 当り５０００～２００００個）で形成することによって、前述した苗の栽培、各種菌の培養に有用なバイオ関連包装材、各種の衣料素材、使い捨てカイロ用包装材として有効に利用し得る多孔質高分子材料フィルム、多孔質積層フィルムを製造できる。また、金属からなる長尺フィルムに適用すると、通気性を有する電磁シールド用多孔質フィルム等を製造することができる。

【００７９】

【実施例】以下、本発明の実施例を図面を参照して詳細に説明する。

実施例１

【００８０】図１は、本実施例１の多孔質フィルムの製造装置を示す概略断面図、図２は図１の製造装置に用いられるプレス機構の下面側から見た斜視図、図３は図１の製造装置により未貫通孔を穿孔する状態を示す要部断面図である。

【００８１】基台１は、ベッド２とこのベッド２の上部に埋設された例えば鉄からなるＡ４サイズの受板３とから構成されている。例えば４本の支柱４は、前記ベッド２上に立設されている。支持板５は、前記４本の支柱４上に固定されている。ピストンロッド６を有するエアーシリンダ７は、前記支持板５に支持され、前記ピストンロッド６は前記支持板４に開孔された穴８を通して下方に延出されている。

【００８２】例えば鉄からなるＡ４サイズのプレス機構９は、前記ピストンロッド６の下端に着脱自在に取り付けられている。前記プレス機構９の前記受板３と対向する面には、図２および図３に示すように鋭い角部を有する多数のモース硬度５以上の粒子である合成ダイヤモンド粒子１０が電着層１１を介して電着されている。前記合成ダイヤモンド粒子は、例えば５０～６０μｍの粒径を有し、前記プレス機構９の面に７０％以上の面積率で電着されている。

【００８３】長尺フィルム供給手段としての間欠動作する供給ロール（図示せず）は、前記受板３の前段に配置されている。前記供給ロールの長尺フィルム１２は、２つの送りロール１３ａ、１３ｂを経由して前記受板３上面に沿って供給され、さらに前記受板３後段の２つの送りロール１４ａ、１４ｂを経由して巻取ロール（図示せず）に巻回される。次に、前述した構成の多孔質フィルムの製造装置の作用を説明する。

【００８４】まず、巻回ロール（図示せず）から長尺フィルム１２（例えばＡ４サイズの幅に相当する幅で、厚さが２０μｍの長尺二軸遠心ポリプロピレン（ＯＰＰ）フィルムを）を２つの送りロール１３ａ、１３ｂを経由して前記受板３上面に沿って供給し、さらに前記受板３後段の２つの送りロール１４ａ、１４ｂを経由して巻取ロール（図示せず）に前記長尺フィルム１２の先端を巻く。

【００８５】前記長尺フィルム１２の先端を巻取ロールに巻き取った後、前記エアーシリンダ７を作動して前記ピストンロッド６を下方に移動させ、前記ピストンロッド６下端に取り付けられた前記プレス機構９を前記受板

3に向けて前記プレス機構9の前記合成ダイヤモンド粒子10の電着面が前記受板3上面に対して一定の隙間をあけて位置するように移動させる。このようなプレス機構9の下方への移動によって、前記受板3と前記プレス機構9との間に位置する前記長尺フィルム11が加圧され、穿孔される。

【0086】すなわち、前記受板3と前記プレス機構9との間に位置される前記長尺フィルム12が加圧されると、前記プレス機構9の前記受板3と対向する面には鋭い角部を有する合成ダイヤモンド粒子10が電着されているため、図3に示すように前記多数の合成ダイヤモンド粒子10の鋭い角部が前記長尺フィルム12に一定深さ食い込んで機械的な穿孔がなされる。その結果、前記長尺フィルム12に前記隙間（h）に相当する超薄膜部分15が残存した多数の未貫通孔16が一様に形成される。

【0087】前記穿孔操作を行った後、前記エアーシリンダ7を動作して前記プレス機構9を上昇させ、前記長尺フィルム12を前記プレス機構9の幅（前記長尺フィルム12の移動方向に沿う辺の長さ）に相当する長さ移動させ、再度、同様な穿孔操作を行う。

【0088】前記受板3と前記プレス機構9間で加圧された前記長尺フィルム部分を切出して得られたA4サイズで、厚さ20μm多孔質OPPフィルムについて、未貫通孔の形状および密度を測定した。その結果、前記多孔質OPPフィルムには開口径20μmの微細寸法の未貫通孔が約10000個／cm^2 の密度で多数かつ一様に穿孔され、前記未貫通孔に対応する残存超薄膜部の厚さが2μmであった。また、前記多孔質OPPフィルムは1.0×10^5 ～2.0×10^5 cc／m^2 ・24hr・23℃の酸素透過量および8～10g／m^2 ・24hr・40℃・90%RHの水蒸気透過量を有していた。したがって、前記多孔質OPPフィルムは酸素透過量が6000～20000cc／m^2 ・24hr・23℃であることが要求される青果物鮮度保持用包装材として有効に利用することができた。

実施例2

【0089】長尺フィルム12として、厚さ30μmのポリエチレン（PE）フィルムに厚さ12μmのポリエチレンテレフタレート（PET）フィルムを接着剤を介して積層した幅200mmの長尺積層フィルムを用い、前記受板3および前記プレス機構9として幅200mm、長さ200mmのものを用い、前記PETフィルムが前述したプレス機構の合成ダイヤモンド粒子電着面側に配置されるように前記受板3上に供給して実施例1同様な操作により穿孔を行った。

【0090】前記受板と前記プレス機構間で加圧された前記長尺積層フィルム部分を切出して得られた多孔質積層フィルム（寸法；200mm×200mm）は、前記PETフィルム側から前記PEフィルムに亘って開口径20μmの微細な未貫通孔が約10000個／cm^2 の密度で多数かつ一様に穿孔され、前記未貫通孔に対応する残存超薄膜部の厚さが3～5μmであった。このような多孔質積層フィルムは、耐水圧性（耐透水性）が高く、酸素、水蒸気透過性を有するため、乾燥剤用包装材、脱酸素剤用包装材として有効に利用できた。

実施例3

図4は、本実施例3の多孔質フィルムの製造装置を示す概略断面図、図5は図4の製造装置に用いられるプレス機構を示す斜視図である。

【0091】基台21は、ベッド22とこのベッド22の上部に埋設された例えば鉄製の受板3とから構成されている。前記受板23は、後述する幅が200mmの長尺積層フィルムと同様な幅と長さを有する。前記受板23上面には、例えばアルミナからなる厚さ3mmの誘電体層24が被覆されている。例えば4本の支柱25は、前記ベッド22上に立設されている。支持板26は、前記4本の支柱25上に固定されている。ピストンロッド27を有するエアーシリンダ28は、前記支持板26に支持され、前記ピストンロッド27は前記支持板25に開孔された穴29を通して下方に延出されている。

【0092】プレス機構30は、前記ピストンロッド27の下端に着脱自在に取り付けられている。前記プレス機構30は、次のような構造になっている。すなわち、図5に示すように前記プレス機構30は下面に帯状の凹部31が形成された鉄製のプレス本体32を備えいている。上面に帯状の凸部33、下面に帯状の凹部34を有する例えばポリカーボネート樹脂からなる絶縁板35は、前記プレス本体32の下面に接着剤等を介して一体的に固定されている。銅製の電極板36は、前記絶縁板35の凹部34に接着剤等を介して固定され、かつ前記絶縁板35の下面から所定の高さ突出している。前記電極板36は、後述する長尺積層フィルムの幅と同様な幅および長さを有する。前記電極板36の前記受板23と対向する面には、前述した実施例1同様に鋭い角部を有する多数のモース硬度5以上の粒子である合成ダイヤモンド粒子37が電着層を介して電着されている。前記合成ダイヤモンド粒子は、例えば70～85μmの粒径を有し、前記電極板36の面に70%以上の面積率で電着されている。

【0093】前記プレス機構30のプレス本体32から前記絶縁板35を貫通して電極端子取出穴38が穿設されている。例えばポリカーボネート樹脂からなる絶縁筒体39は、前記穴38に前記本体32表面から突出するように嵌入されている。高電圧供給端子40は、前記絶縁筒体39に挿入され、前記端子40の先端は前記穴38底面に露出した前記電極板36に接続されている。前記端子40の後端には、高電圧供給源（図示せず）がケーブルを通してそれぞれ接続されている。前記高電圧供給源から高電圧をケーブルを通して前記プレス本体32

に対して前記各絶縁筒体３９で絶縁された前記端子４０に供給することによって、前記電極板３６のみに高電圧が供給される。

【００９４】長尺積層フィルム供給手段としての間欠動作する供給ロール（図示せず）は、前記受板２３の前段に配置されている。前記供給ロールの長尺積層フィルム４１は、２つの送りロール４２ａ、４２ｂを経由して前記受板２３上面の誘電体層２４に沿って供給され、さらに前記受板２３後段の２つの送りロール４３ａ、４３ｂを経由して巻取ロール（図示せず）に巻回される。次に、前述した構成の多孔質フィルムの製造装置の作用を説明する。

【００９５】まず、巻回ロール（図示せず）から長尺積層フィルム４１（例えば幅２００ｍｍ、厚さ２０μｍのポリエチレンフィルムに同幅で厚さが２００μｍの不織布を接着剤を介して積層した長尺積層フィルム）を２つの送りロール４２ａ、４２ｂを経由して前記受板２３の誘電体層２４に沿って供給し、さらに前記受板２３後段の２つの送りロール４３ａ、４３ｂを経由して巻取ロール（図示せず）に前記長尺フィルム４１の先端を巻く。

【００９６】前記長尺積層フィルム４１の先端を巻取ロールに巻き取った後、前記エアーシリンダ２８を作動して前記ピストンロッド２７を下方に移動させ、前記ピストンロッド２７下端に取り付けられた前記プレス機構３０を前記受板２３に向けて移動させ、前記プレス機構３０の電極板３６と前記受板２３上面の誘電体層２４との間に位置される前記長尺積層フィルム４１を加圧する。同時に、高電圧供給源（図示せず）から例えば交流高電圧をケーブルおよび前記高電圧供給端子４０を通して前記プレス機構３０の前記電極板３６に供給し、前記電極板３６の前記受板２３と対向する面に電着された合成ダイヤモンド粒子に供給する。このような処理により前記受板２３と前記プレス機構３０の電極体３６の間に供給された前記長尺積層フィルム４１に多数の凹部が穿孔されると共にそれらの内面が親和化処理される。

【００９７】すなわち、前記プレス機構３０は図４に示すように前記受板２３との対向面に鋭い角部を有する多数の合成ダイヤモンド粒子３７が例えば７０％以上の面積率で電着層を介して付着された銅製の電極体３６を備えた構造になっている。また、前記受板２３は表面に誘電体層２４が被覆された構造になっている。このため、前記受板２３と前記プレス機構３０の電極体３６との間で前記長尺積層フィルム４１を加圧すると、前記電極体３６の多数の合成ダイヤモンド粒子３７の角部が前記長尺積層フィルム４１に一様に食い込んで機械的な穿孔がなされ、多数の逆円錐形状の凹部が形成される。同時に、交流高電圧が供給された前記プレス機構３０の前記電極体３６は前記長尺積層フィルム４１を挟んで表面に誘電体層２４が被覆された受板２３に対向されているため、前記電極体３６表面の誘電体である多数の合成ダイヤモンド粒子３７の角部と前記受板２３の誘電体層２４の間でコロナ放電が一様に発生する。このようなコロナ放電において、前記高電圧供給源からの比較的低い直流高電圧を前記合成ダイヤモンド粒子３７に供給すると、前記合成ダイヤモンド粒子３７が食い込まれた前記長尺積層フィルム４１に比較的エネルギーの低いコロナが一様に照射されるため、前記長尺積層フィルム４１に穿孔された多数の凹部の内面が前記コロナ放電により親和化処理される。

【００９８】前記穿孔操作を行った後、前記エアーシリンダ２８を動作して前記プレス機構３０を上昇させ、前記長尺積層フィルム４１を前記プレス機構３０の幅（前記長尺積層フィルム４１の移動方向に沿う辺の長さ）に相当する長さ移動させ、再度、同様な穿孔操作を行う。

【００９９】従って、前述した多孔質フィルム製造装置によれば、プレス機構３０の電極体３６表面に付着された多数の合成ダイヤモンド粒子３７の鋭い角部による機械的な一様な穿孔とコロナ放電が前記電極体３６に対応する前記長尺積層フィルム４１の領域に対してなされるため、前記長尺積層フィルム４１に前記フィルム材料本来の特性（例えば透明性、ソフト感等）を殆ど損なうことなく、サブμｍ～３００μｍの範囲で任意に選択された微細な開口幅を有し、内面が親和性を示す逆円錐形状をなす凹部を一様かつ多数（例えば１ｃｍ² 当たり５００個～２００，０００個）で形成できる。このような多孔質積層フィルムは、良好な酸素透過性を有するため、使い捨てカイロの包装材としてそのまま利用することができた。一方、前記実施例３において前記高電圧供給源から比較的高い交流高電圧をケーブルおよび高電圧供給端子４０を通して前記プレス機構３０の前記電極体３６に供給すると、前記電極体３６に付着された多数の合成ダイヤモンド粒子３７が食い込まれることにより前記長尺積層フィルム４１に形成された凹部の底部に位置する残存薄膜部に前記合成ダイヤモンド粒子３７の角部におけるエッジ効果により高エネルギーのコロナが主に集中して照射されて穿孔がなされる。このため、前記残存薄膜部に前記凹部の開口幅より小さい径の円柱形状の貫通孔が形成される。また、前記長尺積層フィルム４１に穿孔された多数の凹部の内面および前記貫通孔の内面は前記コロナ放電により親和化処理される。その結果、前記長尺積層フィルム４１に内面が親和性を示す微細な開口幅（例えば約２０μｍ）を有する凹部が多数（例えば１０，０００個／ｃｍ² ）形成され、かつ前記各凹部の底部に位置する例えば平均厚さ約５μｍの残存薄膜部に内面が親和性を示し、前記凹部の開口幅より小さい径（例えば３．５μｍ）を有する円柱状の貫通孔が穿孔された長尺多孔質有機系フィルムを得ることができる。

実施例４

図６は、本実施例４の多孔質フィルムの製造装置を示す概略断面図である。

【0100】基台51は、ベッド52とこのベッド52の上部に埋設された例えば鉄からなる受板53とから構成されている。前記受板は、後述する長尺積層フィルムの幅と同様な幅および長さを有する。例えばシリコーンゴムからなる厚さ3mmの緩衝層54は、前記受板53上面に被覆されている。例えば4本の支柱55は、前記ベッド52上に立設されている。支持板56は、前記4本の支柱55上に固定されている。ピストンロッド57を有するエアーシリンダ58は、前記支持板56に支持され、前記ピストンロッド57は前記支持板56に開孔された穴59を通して下方に延出されている。

【0101】例えば鉄からなるプレス機構60は、前記ピストンロッド57の下端に着脱自在に取り付けられている。前記プレス機構60は、後述する長尺積層フィルムの幅と同様な幅および長さを有する。前記プレス機構60の前記受板3と対向する面には、前述した図2および図3に示すように鋭い角部を有する多数のモース硬度5以上の粒子である合成ダイヤモンド粒子61が電着層を介して電着されている。前記合成ダイヤモンド粒子61は、例えば70～85μmの粒径を有し、前記プレス機構60の所定の面に70%以上の面積率で電着されている。

【0102】長尺積層フィルム供給手段としての間欠動作する供給ロール（図示せず）は、前記受板53の前段に配置されている。前記供給ロールの長尺積層フィルム62は、2つの送りロール63a、63bを経由して前記受板53上面の緩衝層54に沿って供給され、さらに前記受板53後段の2つの送りロール64a、64bを経由して巻取ロール（図示せず）に巻回される。

【0103】まず、巻回ロール（図示せず）から長尺積層フィルム62（例えば幅200mm、厚さ20μmのポリエチレンフィルムに同幅で厚さが250μmの不織布を接着剤を介して積層した長尺積層フィルム）を2つの送りロール63a、63bを経由して前記受板53の緩衝層54に沿って供給し、さらに前記受板53後段の2つの送りロール64a、64bを経由して巻取ロール（図示せず）に前記長尺積層フィルム62の先端を巻く。

【0104】前記長尺積層フィルム62の先端を巻取ロールに巻き取った後、前記エアーシリンダ58を作動して前記ピストンロッド57を下方に移動させ、前記ピストンロッド57下端に取り付けられた前記プレス機構60を前記受板53上面の緩衝層54に向けて移動させ、前記プレス機構60と前記受板53上面の緩衝層54との間に位置される前記長尺積層フィルム62を例えば100kg／cm² の圧力で加圧する。このように前記受板53の緩衝層54と前記プレス機構60との間に位置される前記長尺積層フィルム62が加圧されると、前記プレス機構60の前記緩衝層54と対向する面には鋭い角部を有する合成ダイヤモンド粒子61が電着されているため、前記多数の合成ダイヤモンド粒子61の鋭い角部が前記長尺積層フィルム62に食い込み、前記緩衝層54表面まで達する機械的な穿孔がなされる。その結果、前記長尺積層フィルム62に多数の貫通孔が一様に形成される。

【0105】前記穿孔操作を行った後、前記エアーシリンダ58を動作して前記プレス機構60を上昇させ、前記長尺積層フィルム62を前記プレス機構60の幅（前記長尺積層フィルム62の移動方向に沿う辺の長さ）に相当する長さ移動させ、再度、同様な穿孔操作を行う。

【0106】前記受板53の緩衝層54と前記プレス機構60の間で加圧された前記長尺積層フィルム62部分を切出して得られた多孔質積層フィルム（寸法；200mm×200mm）は、前記PEフィルムに開口径10μmの微細な貫通孔が約10000個／cm² の密度で多数かつ一様に穿孔されていた。このような多孔質積層フィルムは、良好な酸素透過性および透湿性（600～800g／cm² ・24hr）を有するため、使い捨てカイロの包装材としてそのまま利用することができた。

【0107】

【発明の効果】以上詳述したように本発明に係わる多孔質フィルムの製造装置によれば、高分子材料を始めとして多様な材料からなる長尺フィルムに対してそのフィルム材料本来の特性（例えばソフト感、透明性）を殆ど損なうことなくサブμm～十数μmの範囲で任意に選択された微細寸法の多数の均一な貫通孔又は未貫通孔を一様かつ高密度（1cm² 当り5000～200000個）で形成でき、ひいては脱酸素剤、乾燥剤、使い捨てカイロの包装材、青果物鮮度保持用包装材、茸の栽培、各種菌の培養に有用なバイオ関連包装材、使い捨て紙おむつに代表される衛生材料、医療材料、衣料などの素材として有用な多孔質フィルムを製造できる等顕著な効果を奏する。

【0108】また、本発明に係わる多孔質フィルムの製造装置によれば高分子材料、積層物を始めとした各種の長尺フィルムに対してそのフィルム材料本来の特性（例えば透明性、ソフト感、強度等）を殆ど損なうことなくサブμm～300μmの範囲で任意に選択され、それぞれ内面が親和性を示す微細な凹部および前記凹部に底部に繋がる前記凹部の開口幅より小さい径の貫通孔を一様かつ多数（例えば1cm² 当たり500個～200，000個）形成でき、塗布膜形成用ベースフィルム、各種のガスフィルタ、医療素材、青果物鮮度保持用包装材などの機能性フィルム（特に各種のガスフィルタ、青果物鮮度保持用包装材）等の素材として好適な多孔質フィルムを製造できる等顕著な効果を奏する。

【図面の簡単な説明】

【図1】本発明の実施例1における多孔質フィルムの製造装置を示す概略断面図。

【図2】図1の製造装置に用いられるプレス機構の下面

25

側から見た斜視図。

【図3】図1の製造装置により未貫通孔を穿孔する状態を示す要部断面図。

【図4】本発明の実施例3の多孔質フィルムの製造装置を示す概略断面図。

【図5】図4の製造装置に用いられるプレス機構を示す斜視図。

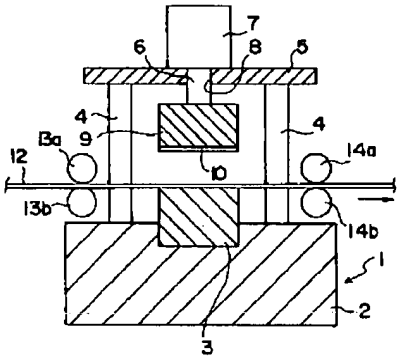
【図6】本発明の実施例3の多孔質フィルムの製造装置を示す概略断面図。

26

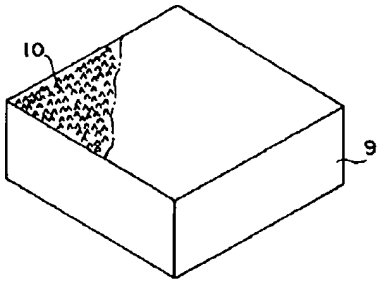
【符号の説明】

1、21、51…基台、3、23、53…受板、7、28、58…エフーシリンダ、9、30、60…プレス機構、10、37、61…合成ダイヤモンド粒子、12…長尺フィルム、15…残存超薄膜部、16…未貫通孔、24…誘電体層、32…プレス本体、36…電極板、39…絶縁筒体、40…高電圧供給端子、41、62…長尺積層フィルム、54…緩衝層。

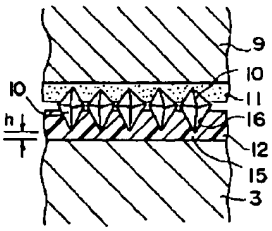
【図1】



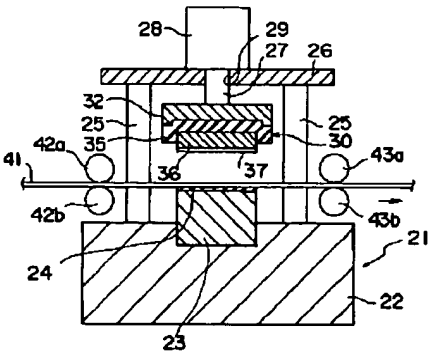
【図2】



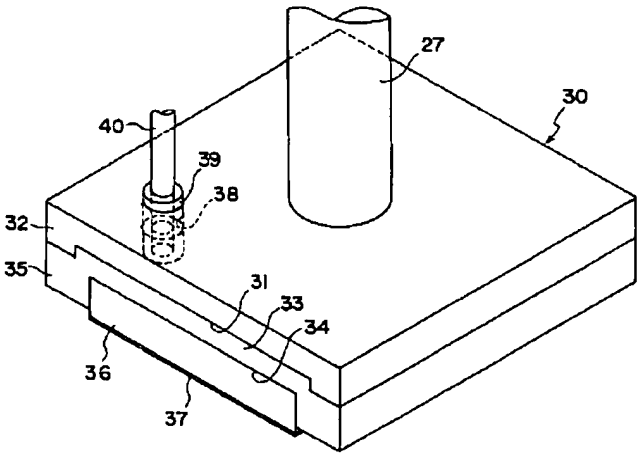
【図3】



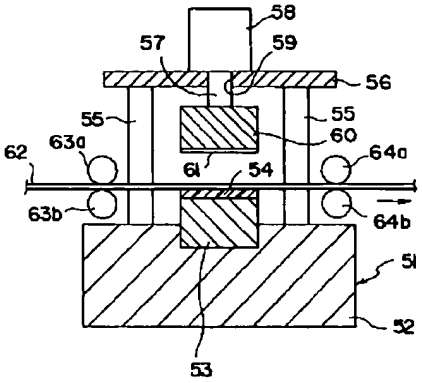
【図4】



【図5】



【図6】



* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the manufacturing installation of a porosity film which has the non-breakthrough or breakthrough of a large number suitable as materials, such as wrapping, hygienic goods, medical material, and garments material, especially about the manufacturing installation of a porosity film.
[0002]
[Description of the Prior Art] inorganic substance powder detailed to an olefine resin (for example, polyethylene) general-purpose as the manufacture method of the former and this kind of film -- being extensive (more than 50 volume % [as opposed to / a resin / usually]) -- film-izing and extending for a high scale factor to further 1 shaft or 2 shaft orientations, after being filled up -- an interface with the aforementioned inorganic substance powder -- destruction -- it is the method of carrying out opening of the detailed hole which formed the hole and was open for free passage in maze However, the conventional manufacture method mentioned above had the following problems.
[0003] (1) Since inorganic substance powder is added in large quantities, the properties (for example, intensity, a soft feeling, transparency, etc.) of resin original which constitute a film cannot fall remarkably, and cannot obtain a plastics-like film substantially.
[0004] (2) Inorganic substance powder is added in large quantities, and since the technique extended for a high scale factor to one shaft or 2 shaft orientations is adopted, it is inapplicable to the film which has elasticity like an elastomer film.
[0005] Moreover, mechanical terebration like the needle punch method or the thermofusion terebration as the manufacture method of another porosity film is also known. The describing [above] needle punch method is the method of pushing and punching the needle heated by the thermoplastics film. The aforementioned thermofusion terebration is the method of fusing a thermoplastics film by the heated embossing roll, and punching.
[0006] however, about [that the aforementioned mechanical punching method has the large size of a hole about 100 micrometers, and it is difficult to punch a hole more detailed than this] and the above -- there is a problem that a hole cannot be punched by high density (for example, per [1cm2] 5000 or more pieces)
[0007] without the purpose of this invention spoils most of the property of film material original to the long film which consists of various material including polymeric materials and a metal -- sub mum- they are uniform and the thing which offers the manufacturing installation of the porosity film which can be formed by high density (per [1cm2] 5000-200000 pieces) about many the uniform breakthroughs or the non-breakthroughs of a detailed size which were arbitrarily chosen in about ten micrometers
[0008] the purpose of this invention -- various kinds of long organic system films including polymeric materials -- receiving -- the property (for example, transparency --) of film material original It has the detailed opening width of face arbitrarily chosen in sub mum-300micrometer, without spoiling most of intensity, a soft feeling, etc. And an inside offers the manufacturing installation of the uniform porosity film which can form a large number (for example, per [1cm2] 500-200,000 pieces) for the crevice which shows compatibility.
[0009] the purpose of this invention -- a long organic system film -- receiving -- the property (for example, transparency --) of film material original It has the detailed opening width of face arbitrarily chosen in sub mum-300micrometer, without spoiling most of intensity, a soft feeling, etc. and an inside is uniform in the crevice which shows compatibility -- and, while being able to form a large number (for example, per [1cm2] 500-200,000 pieces) The manufacturing installation of the porosity film which can form in the residual thin film section of the aforementioned film corresponding to the pars basilaris ossis occipitalis of the aforementioned crevice the breakthrough of a path with an inside smaller than the aforementioned opening width of face which shows compatibility is offered.
[0010]
[Means for Solving the Problem] The manufacturing installation of the porosity film concerning this invention The supply means for supplying a long film, and the pedestal by which the aforementioned long film is passed, A press means by which it adhered in the field where the particle of with a Mohs hardness of five or more a large number which are arranged free [movement] so that the aforementioned long film may be pressurized between the aforementioned pedestals, and have a sharp corner counters with the aforementioned pedestal, It is characterized by providing the driving means for moving the aforementioned press means to the aforementioned pedestal so that the aforementioned particle adhesion side of the aforementioned press means may open the

crevice between desired to the aforementioned pedestal front face and it may be located.
[0011] As the aforementioned film, for example Polyethylene, polypropylene, a polyethylene terephthalate, General-purpose polymeric-materials films, such as polyester, a polyvinyl chloride, polyester, a fluororesin, and a polyamide; A polycarbonate, Engineering plastic film, such as a polyimide, or a polyether ether ketone, Super engineering-plastics films, such as a polyether ketone; An elastomer film, To polymeric materials, In addition, a heat weld nature resin film, foaming paper; Silica powder, carbon powder, The polymeric-materials film with which the quality of the materials differ The complex film which mixed minerals powder, such as alumina powder; Two-layer or the laminated film laminated three layers, The laminated film which laminated textile fabrics, a nonwoven fabric, or paper on the polymeric-materials film, the laminated film which laminated metallic foils, such as an aluminum foil and copper foil, on the polymeric-materials film; metal films, such as an aluminum film and a copper film, etc. can be mentioned. In addition, as the aforementioned film, a thing with a thickness of 3.5 micrometers - 1mm can usually be used.
[0012] The roll which looped around various kinds of aforementioned films as a supply means for supplying the aforementioned long film, for example can be used. Moreover, when the aforementioned long film consists of polymeric materials, the film manufacture machine by the tubular film process or the film manufacture machine by the casting method can be used as the aforementioned supply means.
[0013] The aforementioned pedestal is formed from various kinds of hard metals, such as iron and an iron system alloy. Metal layers, such as nickel and Cr, may be formed in the aforementioned pedestal front face by plating technology etc.
[0014] The aforementioned press means has the main part which consists of iron, an iron system alloy, etc. Moreover, metal layers, such as nickel and Cr, may be formed in the front face of the aforementioned main part by plating technology etc. It permits making the aforementioned main part into the size of a final product (for example, packing material of a deoxidant and a drying agent).
[0015] It is suitable to be able to adopt the pasting-up method by the binder of an electrodeposition process, an organic system, or an inorganic system etc. as the aforementioned pedestal of the aforementioned main part and the field which counters, for example as a method of adhering a with a Mohs hardness [of a large number which have a sharp corner] of five or more particle, and to adhere the aforementioned particle to the aforementioned main part especially by the electrodeposition process. When adhering the aforementioned particle to the predetermined field of the aforementioned press means by such electrodeposition process, it is desirable to form nickel layer and Cr layer in the predetermined field of the aforementioned main part with plating technology etc.
[0016] As a with an aforementioned Mohs hardness of five or more particle, cemented carbide particles, such as tongue ten carbide, or a silicon carbide particle, a boron-carbide particle, a sapphire particle, a cubic boron nitride (CBN) particle, nature, or a composite diamond particle can be mentioned, for example. A synthetic-diamond particle with especially large a degree of hardness, intensity, etc. is desirable. As for the aforementioned particle, it is desirable for dispersion in particle size to use particle size] 5% or less of thing by 10-100 micrometers. As for the particle of aforementioned a large number, it is desirable to make the aforementioned pedestal of the aforementioned main part of a press and the field which counters a non-breakthrough adhere to the aforementioned long film 70% or more from a viewpoint formed by high density. As the aforementioned driving means, a pneumatic cylinder, an oil hydraulic cylinder, the cylinder that makes a servo motor a driving source can be mentioned, for example.
[0017] In the manufacturing installation of the porosity film concerning this invention, it permits making a with a Mohs hardness of a large number which have the sharp corner mentioned above on the aforementioned pedestal front face] of five or more particle adhere according to electrodeposition etc.
[0018] Moreover, the manufacturing installation of another porosity film concerning this invention The supply means for supplying a long film, and the pedestal with which the dielectric layer was covered by the aforementioned front face while the aforementioned long film was passed and the front face was formed by the electrical conducting material at least, A press means by which the dielectric particle of with a Mohs hardness of five or more a large number which are arranged free [movement] so that the aforementioned long film may be pressurized between the aforementioned pedestals, and have a sharp corner has the electrode object which adhered in the aforementioned pedestal and the field where it counters, The aforementioned press means is moved to the aforementioned pedestal, and it is characterized by providing the driving means for pressurizing the aforementioned long film located among them, and the high-voltage-supply means for supplying the high voltage to the aforementioned electrode object of the aforementioned press means.
[0019] The aforementioned long film will be easy to be what thing, if it consists of an insulating material. Specifically Polyolefine films, such as polyethylene and polypropylene, Various kinds of polymeric-materials films, such as polyester film and an elastomer film; Polyethylene foam, To polymeric materials, Various kinds of foaming polymeric-materials films, such as a polypropylene foam; Silica powder, The polymeric-materials film with which the quality of the materials differ The complex film which mixed minerals powder, such as carbon powder and alumina powder; Two-layer or the laminated film laminated three layers, Various kinds of laminated films, such as a laminated film which laminated paper, etc. can be used for the laminated film which laminated textile fabrics or the nonwoven fabric on the polymeric-materials film, and a polymeric-materials film. Moreover, as the aforementioned film, a thing with a thickness of several micrometers - 5mm can usually be used. **'s can be used for the aforementioned long film supply means for the structure same with having mentioned above
[0020] The aforementioned pedestal needs to form the front face by the electrical conducting material at least. As this pedestal, shell formation is carried out, for example from various kinds of metals, such as iron or an iron system alloy. Moreover, the aforementioned base is formed from a metal or an insulating material, nickel layer and Cr layer may be covered with plating

technology etc. on the front face, and a front face may be formed in it by the electrical conducting material at least.
[0021] As a dielectric layer covered by the aforementioned pedestal front face, it is formed, for example from insulating ceramics, such as silicone rubber or an alumina, a zirconia, a mullite, and silicon nitride, etc. Since a high-voltage-proof property and intensity are excellent, especially the aforementioned insulating ceramic is suitable. As for the thickness of the aforementioned dielectric layer, it is desirable to make it about 2-5mm. After adopting a spraying process and covering the aforementioned ceramic layer with thermal spraying on the aforementioned pedestal front face in order to cover the aforementioned ceramic layer on the aforementioned pedestal front face for example, it is desirable to perform polishing processing and to make the aforementioned ceramic layer front face smooth.
[0022] It is fixed to the main part which consists of a metallic material, the electric insulating plate fixed to the field which counters the aforementioned pedestal side of the aforementioned main part, and the aforementioned electric insulating plate, and the aforementioned press means has the structure equipped with the aforementioned electrode object which adhered to the with a Mohs hardness [of aforementioned a large number] of five or more conductive particle in the field by the side of the aforementioned pedestal.
[0023] The aforementioned main part is formed from metallic materials, such as iron and an iron system alloy. Moreover, metal layers, such as nickel and Cr, may be formed in the front face of the aforementioned main part by plating technology etc.
[0024] Polymeric materials, a ceramic, etc. can be used for the aforementioned electric insulating plate. Engineering plastics, such as polycarbonate resin which was excellent in a high-voltage-proof property and intensity especially, are suitable.
[0025] The aforementioned electrode object is formed from what covered the nickel-plating layer and the chrome plating layer to copper and a copper alloy or iron and iron alloys, or these surfaces of metal. It permits making the aforementioned electrode object into the size of a final product (for example, packing material for deoxidants).
[0026] The aforementioned electrode object has the configuration where the field where it adheres to the conductive particle of for example, aforementioned a large number is flat. Moreover, it permits that it makes the aforementioned field of the aforementioned electrode object a curved surface with a final-product size corresponding to the aforementioned film configuration when the aforementioned organic system film has a curved-surface configuration. In using the electrode object of such a configuration, it makes the supporting plate of the aforementioned pedestal into a curved-surface configuration so that it may agree on the curved surface of the aforementioned electrode object.
[0027] As a with an aforementioned Mohs hardness of five or more dielectric particle to which it adheres in the aforementioned pedestal of the aforementioned electrode object, and the field which counters, a silicon carbide particle, nature, or a composite diamond particle (dielectric constant; 5.7) can be mentioned, for example. When it has isolation voltage (3.5x106 V/cm) with them, since especially a synthetic-diamond particle can receive that to which particle size was equal, it is suitable. [a degree of hardness, large and intensity, etc.] [high] As for the aforementioned dielectric particle, it is desirable for dispersion in particle size to use [particle size] 5% or less of thing by 10-100 micrometers. As for the particle of aforementioned a large number, it is desirable to make the aforementioned pedestal of the aforementioned press means and the field which counters a breakthrough adhere to a film 70% or more from a viewpoint formed by high density.
[0028] Moreover, it permits that the aforementioned press means has the structure equipped with the main part which consists of an insulating material, and the aforementioned electrode object which it was fixed to the aforementioned main part and adhered to the conductive particle of aforementioned a large number in the field by the side of the aforementioned pedestal.
[0029] As the aforementioned driving means, a pneumatic cylinder, an oil hydraulic cylinder, the cylinder that makes a servo motor a driving source can be mentioned, for example. It is desirable to perform movement of the aforementioned press means by the aforementioned driving means so that the sharp corner of the conductive particle of aforementioned a large number to which it adhered in the field of the aforementioned electrode object of the aforementioned press means may open the aforementioned dielectric-layer front face of the aforementioned pedestal and the crevice between desired and may counter.
[0030] As the aforementioned press means mentioned above, when it consists of electrode objects which adhered to the main part which consists of an electrical conducting material, an electric insulating plate, and many conductive particles, as for the aforementioned high-voltage-supply means, it is desirable to make it the following structures. That is, it is desirable to constitute the aforementioned high-voltage-supply means from a source of a high voltage supply (for example, AC power supply or DC power supply) connected to the high-voltage-supply terminal inserted so that a nose of cam might contact the insulating barrel inserted by penetrating the aforementioned main part and the aforementioned electric insulating plate and the aforementioned insulating barrel from the field of the aforementioned main part of the aforementioned pedestal and an opposite side at the aforementioned electrode object, and the aforementioned supply terminal. It is desirable to prepare especially the control-section material for controlling the high voltage further supplied to the aforementioned electrode object in the connection path of the aforementioned high-voltage-supply terminal and the aforementioned source of a high voltage supply. The aforementioned insulating barrel is formed from polymeric materials, a ceramic, etc. Especially, engineering plastics, such as polycarbonate resin which was excellent in a high-voltage-proof property and intensity, are suitable.
[0031] Furthermore, the supply means for the manufacturing installation of another porosity film concerning this invention supplying a long film, A press means by which it adhered in the field where the particle of with a Mohs hardness of five or more a large number which are arranged free [movement] so that the aforementioned long film may be pressurized between the pedestal by which the aforementioned long film is passed, and the aforementioned pedestal, and have a sharp corner counters with the aforementioned pedestal, The aforementioned press means is moved to the aforementioned pedestal, and it is characterized by providing the driving means for pressurizing the aforementioned long film located among them. As the aforementioned long film,

various kinds of polymeric-materials films mentioned above, for example, a laminated film, a metal film, etc. can be mentioned. **'s can be used for the aforementioned long film supply means for the structure same with having mentioned above
[0032] The aforementioned pedestal is formed from various kinds of hard metals, such as iron and an iron system alloy. Moreover, in the aforementioned pedestal front face, it permits that a buffer coat is covered. Although formed from various kinds of polymeric materials as the aforementioned buffer coat, the high urethane resin of buffer action especially to the aforementioned long film, silicone rubber, etc. are suitable. By covering such a buffer coat on the aforementioned pedestal front face, it becomes possible to punch the breakthrough of a size which was equal to the aforementioned long film.
[0033] The aforementioned press means has the main part which consists of iron, an iron system alloy, etc. Moreover, metal layers, such as nickel and Cr, may be formed in the front face of the aforementioned main part by plating technology etc. It permits making the aforementioned main part into the size of a final product (for example, the packing material of a deoxidant and a drying agent, the packing material of disposable Cairo). Having mentioned above and the same thing can be used as a with an aforementioned Mohs hardness of five or more particle. As the aforementioned driving means, a pneumatic cylinder, an oil hydraulic cylinder, the cylinder that makes a servo motor a driving source can be mentioned, for example.
[0034]
[Function] The supply means for supplying a long film according to the manufacturing installation of the porosity film concerning this invention, A press means by which it adhered in the field where the particle of with a Mohs hardness of five or more a large number which are arranged free [movement] so that the aforementioned long film may be pressurized between the pedestal by which the aforementioned long film is passed, and the aforementioned pedestal, and have a sharp corner counters with the aforementioned pedestal, By providing the driving means for moving the aforementioned press means to the aforementioned pedestal so that the aforementioned particle adhesion side of the aforementioned press means may open the crevice between desired to the aforementioned pedestal front face and it may be located Polymeric materials, A metal is made into the start. As opposed to the long film which consists of various material without it spoils most (they are a soft feeling, transparency, etc. in the case of for example, a polymeric-materials film) of the property of film material original -- sub mum- the uniform non-breakthrough of about ten-micrometer a large number can be formed uniformly continuously at high density (per [1cm2] 5000-200000 pieces)
[0035] That is, the aforementioned long film which is moved so that the aforementioned press means may open the crevice between desired in the aforementioned pedestal to the aforementioned pedestal front face and it may be located, and is located between the aforementioned press means and the aforementioned pedestal in the aforementioned press means is pressurized by the aforementioned driving means. Since it adheres to the aforementioned pedestal of the aforementioned press means, and the particle (for example, synthetic-diamond particle) of with a Mohs hardness of five or more a large number which have a sharp corner in the field which counters, the sharp corner of the synthetic-diamond particle of aforementioned a large number eats into the aforementioned film in regularity depth, and mechanical punching is made. Consequently, the non-breakthrough of a large number in which the super-thin film portion which is equivalent to the aforementioned long film in the aforementioned crevice remained can be formed uniformly. concrete -- sub mum- the non-breakthrough of the detailed size arbitrarily chosen in about ten micrometers can be formed by uniform and high density (per [1cm2] 5000-200000 pieces) And since the aforementioned punching operation is made according to the mechanical force by the synthetic-diamond particle to which the aforementioned press means adhered, it can form many uniform non-breakthroughs of a detailed size in the aforementioned long film for spoiling-most properties of aforementioned film material original ****. after performing such punching operation, it is made to move so that the aforementioned press means may be separated from the aforementioned pedestal by the aforementioned driving means, and the aforementioned long film is corresponded to the width of face (the length of the side which meets in the move direction of the aforementioned long film) of the aforementioned press means -- length movement is carried out and the same punching operation is carried out again
[0036] The porosity film of various uses can be obtained by applying the punching operation by the above manufacturing installations to the material explained below or the long film of structure.
[0037] (1) Although ****** does not have a non-breakthrough detailed on polymeric-materials films, such as polypropylene films, such as a 2 shaft centrifugal polypropylene film and a casting polypropylene film, a polyethylene film, and a polyethylene-terephthalate film, a large number and by punching uniformly, the functional film in which the oxygen gas permeability by the residual super-thin film portion corresponding to the aforementioned sheep breakthrough, carbon-dioxide-gas permeability, and steam permeability are shown can be obtained.
[0038] Specifically, it can use for the functional packing material for garden stuff freshness maintenance. That is, when seal packing of the garden stuff is carried out, the oxygen density in a packing material decreases by own respiration of garden stuff, carbon-dioxide-gas concentration increases, hypoxia and the conditions of a high carbon dioxide are added, respiration is suppressed, and freshness maintenance of garden stuff is made. In this case, it is required that the gas permeability of the film which is the material of the aforementioned packing material penetrates the oxygen at its minimum into which each garden stuff breathes normally and can maintain a life object, that it is controlled so that the carbon-dioxide-gas concentration generated by respiration does not become superfluous, either, that the dew condensation leading to bacteria propagation should not arise, etc.
[0039] The amount of transparency of the oxygen by the dissolution of gas whose film material has a non-breakthrough with the aforementioned porosity polymeric-materials film detailed on a polymeric-materials film in an a large number and residual corresponding to / it is punched uniformly and / the aforementioned sheep breakthrough] super-thin film portion, and diffusion, carbon dioxide gas, and a steam increases sharply. For this reason, the packing material produced from the aforementioned

porosity polymeric-materials film has the outstanding garden stuff freshness maintenance operation.
[0040] (2) for example, the long laminated film which carried out the laminating of the 2nd film which turns into the 1st film which consists of polyethylene or polypropylene from a polyethylene terephthalate -- using -- the 1st film of the above from the 2nd film side of the aforementioned long laminated film -- continuing -- a detailed non-breakthrough -- a large number -- and punch uniformly and manufacture a porosity laminated film However, a breakthrough is formed in the 2nd film of the above. Such a porosity laminated film has high water pressure-proof nature (water permeability-proof), and it can use it suitably as oxygen, the packing material for drying agents of the low price which has steam permeability, and a packing material for deoxidants.
[0041] That is, the conventional packing material for deoxidants drills many breakthroughs in the bilayer film of a polyethylene-terephthalate film and a polyethylene film by the needle punch method etc., and since it has structure which carried out the laminating of the Japanese paper to the polyethylene film side of the aforementioned bilayer film, the part and price which carry out the laminating of the Japanese paper become high. Moreover, when it contains to an airtight container with liquefied contents, there is a problem of degrading the deoxidant which the aforementioned contents trespassed upon the interior through the aforementioned breakthrough and the hole of Japanese paper, and contained in it.
[0042] If it is made a saccate and the packing material for deoxidants is produced so that the 1st film of the above which has the residual super-thin film section using the aforementioned porosity laminated film may become inside, the oxygen of the external world will pass along many breakthroughs of the 2nd film of the above, and oxygen will penetrate it by the dissolution of the gas which a film material has in the residual super-thin film portion corresponding to the non-breakthrough of the 1st film of the above further, and diffusion. Moreover, the aforementioned amount of oxygen transparency can be made to fluctuate by adjusting the thickness of the aforementioned residual super-thin film portion, and the number of breakthroughs. Therefore, if a deoxidant is contained to the aforementioned packing material and the high airtight container of gas barrier nature is loaded with contents, such as confectionery, since the oxygen in the aforementioned container will penetrate the aforementioned packing material and will be absorbed by the aforementioned deoxidant, the inside of the aforementioned container changes into the state where oxygen does not exist, and quality degradation accompanying oxidization of the aforementioned contents can be prevented. And it can prevent that the aforementioned contents trespass upon the interior through the aforementioned packing material, and the aforementioned packing material degrades the deoxidant in it even if the aforementioned contents are liquids, since it has high water permeability-proof. Consequently, it can save only by preparing some kinds of packing materials for a long period of time of the contents of the shape of a liquid and a solid-state].
[0043] Moreover, if it is made a saccate and the packing material for drying agents is produced so that the 1st film of the above which has many non-breakthroughs using the aforementioned laminating complex film may become inside, the steam of the external world will pass along many breakthroughs of the 2nd film of the above, and a steam will penetrate it by the dissolution of the gas which a film material has in the residual super-thin film portion corresponding to the non-breakthrough of the 1st film of the above further, and diffusion. Therefore, if a drying agent is contained to the aforementioned packing material and the high airtight container of gas barrier nature is loaded with contents, such as confectionery, since the steam in the aforementioned container will penetrate the aforementioned packing material and will be absorbed by the aforementioned drying agent, the inside of the aforementioned container is made to dryness, and quality degradation by the moisture of the aforementioned contents can be prevented.
[0044] (3) If a resin solution and ink are applied to the porosity film which consists a detailed non-breakthrough of a large number and general-purpose polymeric materials punched uniformly and it dries, the laminate film with which the thin film which was excellent in adhesion to the aforementioned film with anchoring of many non-breakthroughs of the aforementioned film was covered can be formed.
[0045] Moreover, a non-breakthrough can be punched from a front-face [of the aforementioned long film], and rear-face side by using the pedestal in which the front face adhered to the particle (for example, synthetic-diamond particle) of with a Mohs hardness of five or more a large number which have a sharp corner. Namely, if the aforementioned long film which is made to move the aforementioned press means by driving means so that the aforementioned press means may open the crevice between desired in the aforementioned pedestal and may be located in it to the aforementioned pedestal front face, and is located between the aforementioned press means and the aforementioned pedestal is pressurized While the aforementioned pedestal of the aforementioned press means and the particle (for example, synthetic-diamond particle) of with a Mohs hardness of five or more a large number which have the sharp corner to which it adhered in the field which counters eat into the aforementioned film in regularity depth The corner of the aforementioned synthetic-diamond particle by the side of the aforementioned pedestal eats in regularity depth on the aforementioned film, and mechanical punching is made by **. Consequently, the non-breakthrough of a large number to which the super-thin film portion which is equivalent to the aforementioned long film in the aforementioned crevice remained in the rear-face side, and the non-breakthrough of a large number to which the super-thin film portion equivalent to the aforementioned crevice remained in the front-face side can be formed uniformly. Therefore, compared with the case where the manufacturing installation to which many aforementioned synthetic-diamond particles were made to adhere punches, it is remarkably high-density and the non-breakthrough of a detailed size can be formed only in the pedestal opposite side side of the aforementioned press means.
[0046] Furthermore, if punching operation which has the size of a final product (for example, packing material of a deoxidant and a drying agent) and which was comparatively mentioned above using the press means of a small size is performed Since the profile irregularity of the aforementioned press means can be raised, it is remarkably highly precise and the opposite distance (crevice) of the aforementioned pedestal and the aforementioned press means at the time of the pressurization of the

aforementioned long film can be set up, The non-breakthrough of a large number to which the depth (thickness of a residual super-thin film portion) was equal to the aforementioned long film can be punched with sufficient repeatability. Therefore, the porosity laminated film which can be used for the very quality packing material for deoxidants and the packing material for drying agents can be obtained by applying such punching operation to the long laminated film explained above (2).

[0047] Furthermore, what the field where it adhered to the aforementioned synthetic-diamond particle as the aforementioned press means in the manufacturing installation of porosity IRUMU concerning this invention equipped with the main part which has a curved-surface configuration corresponding to the film (for example, half-finished products of the shoes which consist of a layered product of synthetic leather and a nonwoven fabric) which has a final-product size is used. And if what has the configuration which agrees with the curved surface of the aforementioned main part of the aforementioned press means as the aforementioned pedestal is used, the porosity film of the final-product size which has moisture permeability etc. can be manufactured.

[0048] Moreover, the supply means for supplying a long film according to the manufacturing installation of the porosity film concerning this invention, The pedestal with which the dielectric layer was covered by the aforementioned front face while the aforementioned long film was passed and the front face was formed by the electrical conducting material at least, A press means by which the dielectric particle of with a Mohs hardness of five or more a large number which are arranged free [movement] so that the aforementioned long film may be pressurized between the aforementioned pedestals, and have a sharp corner has the electrode object which adhered in the aforementioned pedestal and the field where it counters, By moving the aforementioned press means to the aforementioned pedestal, and providing the driving means for pressurizing the aforementioned long film located among them, and the high-voltage-supply means for supplying the high voltage to the aforementioned electrode object of the aforementioned press means the long film which consists of various organic system material including polymeric materials -- receiving -- the property (for example, transparency --) of film material original uniform in the crevice where it has the detailed opening width of face arbitrarily chosen in sub mum-300micrometer, without spoiling most of intensity, a soft feeling, etc., and an inside shows compatibility -- and a large number (for example, per [1cm2] 500-200,000 pieces) can be formed

[0049] Namely, if the aforementioned long film (for example, long organic system film) which was made to move the aforementioned press means to the aforementioned pedestal with which the dielectric layer was covered by the front face, and was supplied by the aforementioned driving means between the electrode object of the aforementioned press means and the aforementioned pedestal is pressurized The sharp corner of many synthetic-diamond particles to which it adhered in the aforementioned pedestal of the aforementioned electrode object and the field which counters should eat into the aforementioned film uniformly, and mechanical punching should do. Many crevices of the shape for example, of a reverse cone which has detailed opening width of face are formed without spoiling the properties (for example, transparency, intensity, a soft feeling, etc.) of aforementioned film original. Simultaneously, if the high voltage is supplied to the aforementioned electrode object of the aforementioned press means from the aforementioned high-voltage-supply means, since the aforementioned electrode object has countered with the aforementioned pedestal with which the aforementioned dielectric layer was covered by the front face on both sides of the aforementioned long organic system film, corona discharge will generate it uniformly between the synthetic-diamond particle of a large number which are the dielectrics (dielectric constant; 5.7) to which the aforementioned electrode object adhered, and the dielectric layer of the aforementioned pedestal. In such corona discharge, if the low high voltage is comparatively supplied to the aforementioned synthetic-diamond particle from the aforementioned high-voltage-supply means, since the low corona of energy will be comparatively irradiated uniformly by the aforementioned long organic system film with which the aforementioned synthetic-diamond particle ate away, the inside of the crevice of a large number punched at the aforementioned long organic system film is affinity--ization-processed by the aforementioned corona discharge.

[0050] On the other hand, if the comparatively high high voltage is supplied to the aforementioned electrode object from the aforementioned high-voltage-supply means, the corona of a high energy will mainly concentrate, will be irradiated by the residual thin film section located in the bottom of the aforementioned crevice formed in the aforementioned long organic system film into which the synthetic-diamond particle of aforementioned a large number ate by the electric discharge concentration in the corner of the synthetic-diamond particle of aforementioned a large number, i.e., an edge effect, and punching will be made. For this reason, the breakthrough of a path smaller than the opening width of face of the aforementioned crevice, the shape of for example, a cylindrical shape, is formed in the aforementioned residual thin film section. Moreover, the inside of the crevice of a large number punched at the aforementioned long organic system film and the inside of the aforementioned breakthrough are affinity--ization-processed by the aforementioned corona discharge.

[0051] after performing such punching and corona discharge processing, it is made to move so that the aforementioned press means may be separated from the aforementioned pedestal by the aforementioned driving means, and the aforementioned long organic system film is corresponded to the width of face (the length of the side which meets in the move direction of the aforementioned long film) of the aforementioned press means -- length movement is carried out and the same punching and corona discharge processing are carried out again

[0052] according to the above manufacturing installations -- an organic system film -- receiving -- the property (for example, transparency --) of film material original It has the detailed opening width of face arbitrarily chosen in sub mum-300micrometer, without spoiling most of intensity, a soft feeling, etc. An inside the crevice which shows compatibility And since [uniform and since a large number (for example, per / 1cm2 / 500-200,000 pieces) can be formed], The porosity film which has the outstanding wettability, does not penetrate water, bacteria, and various germs, but penetrates gas and steams, such as oxygen gas and carbon dioxide gas, and has the controllability of the amount of gas transparency and the amount of steam transparency etc.

can be manufactured. Such a porosity film can be used effective in various packing materials, such as a base film for application film formation explained below, a film for laminatings or a packing material for garden stuff freshness maintenance, and a packing material for deoxidants, the elasticity base film of a ****** agent, the glove for an operation, etc.

[0053] Namely, since many crevices where an inside shows compatibility are formed, compared with the organic system film with which the aforementioned crevice does not exist, as for the aforementioned porosity film, wettability is improved remarkably. Moreover, the aforementioned porosity film shows the anchor effect which was excellent in the part of the crevice of aforementioned a large number to the aforementioned adhesives layer etc., when an adhesives layer etc. is applied to the opening side of the crevice of aforementioned a large number, since many detailed crevices are formed. Such an aforementioned porosity film can be used as the base film for application film formation explained below, and a film for laminatings.

[0054] (1) The resin solution containing magnetic powder can be applied to the field by the side of opening of many crevices of the aforementioned porosity film, and the magnetic layer which was excellent in adhesion to the aforementioned porosity film with the wettability and the anchor effect in the detailed crevice of a majority of aforementioned aforementioned porosity films can be covered by drying. Therefore, the porosity film with which the aforementioned magnetic layer was covered can be used as a magnetic film. Since the aforementioned magnetic powder can be made especially buried in the crevice of a majority of aforementioned porosity films, even if it makes thickness of the aforementioned magnetic layer thin, the pack density of the aforementioned magnetic powder can be improved. Consequently, it becomes possible to obtain a thin magnetic film recordable high-density like a prepaid card, for example.

[0055] (2) The ink layer which applied ink to the field by the side of opening of many crevices of the aforementioned porosity film, and was excellent in adhesion to the aforementioned porosity film with the wettability of many detailed crevices of the aforementioned porosity film and the anchor effect by drying can be covered. Therefore, the porosity film with which the aforementioned ink layer was covered can be used as an ink ribbon. Since you can make it especially filled up with the aforementioned ink also in the crevice of a majority of aforementioned porosity films, even if it makes the aforementioned ink layer thickness thin, the coverage of the aforementioned ink can be improved. Consequently, good printing record is possible and it becomes possible to obtain a thin ink ribbon.

[0056] (3) In case the laminating of the aforementioned adhesives, an incompatible organic system film (the 1st organic system film), the aforementioned adhesives, and the dissolving organic system film (the 2nd organic system film) is carried out using predetermined adhesives, form many detailed crevices in the aforementioned 1st organic system film, consider as a porosity film, apply the aforementioned adhesives to the field by the side of opening of the crevice of the aforementioned porosity film, and paste up and carry out the laminating of the aforementioned 2nd organic system film to these adhesives. In such a laminating, the aforementioned adhesives paste up the aforementioned porosity film good by the wettability of the detailed crevice of the large number, and the anchor effect. On the other hand, the aforementioned 2nd organic system film has compatibility to the aforementioned adhesives. Consequently, the above 1st and the 2nd organic system film can obtain the laminated film pasted up good with the aforementioned adhesives.

[0057] Moreover, since many crevices where it has detailed opening width of face on the aforementioned organic system film, and an inside shows compatibility are formed, the aforementioned porosity film cannot penetrate water, bacteria, and various germs in the residual thin film section of the aforementioned film corresponding to the crevice pars basilaris ossis occipitalis of aforementioned a large number, but can penetrate gas and steams, such as oxygen gas and carbon dioxide gas, and can control the aforementioned amount of gas transparency, and the amount of steam transparency. Since the dissolution of the gas which a film material has in the residual thin film section of the aforementioned organic system film, and diffusion specifically take place, the amount of transparency of oxygen gas and carbon dioxide gas increases sharply. Moreover, it adheres to the crevice where an inside shows compatibility, and that a majority of aforementioned organic system films of a steam are detailed and since diffusion of the steam which a film material has in the aforementioned residual thin film section of the aforementioned crevice pars basilaris ossis occipitalis takes place, the amount of transparency of a steam increases sharply. For this reason, the porosity film which has the functionality by which the amount of transparency of the aforementioned oxygen gas and carbon dioxide gas and the amount of transparency of a steam were controlled is obtained by controlling the opening width of face of the aforementioned crevice, and the thickness of the aforementioned residual thin film section corresponding to the number and these crevices. The amount of oxygen gas transparency of the aforementioned porosity film has 103 -107 cc/m2 and 24hr, and 25 degrees C. The porosity film which has such functionality is applicable to the packing material explained below.

[0058] (1) For example, many detailed and the porosity films with which the inside formed the crevice which has compatibility can be used for the organic system film which consists of a polyethylene film, a biaxial-stretching polypropylene film, a polypropylene film, a polyethylene-terephthalate film, etc. at the packing material for garden stuff freshness maintenance.

[0059] That is, when seal packing of the garden stuff is carried out, the oxygen density in a packing material decreases by own respiration of garden stuff, and carbon-dioxide-gas concentration increases. For this reason, therefore respiration of the aforementioned garden stuff is suppressed by high concentration-ization of the fall of the amount of oxygen, and a carbon dioxide, and freshness maintenance of the aforementioned garden stuff is made. In this case, it is required that the film which is the material of the aforementioned packing material penetrates the oxygen at its minimum into which each garden stuff breathes normally and can maintain a life object, that it is controlled so that the carbon-dioxide-gas concentration generated by respiration does not become superfluous, either, that the steam which causes the dew condensation leading to bacteria propagation should be penetrated, etc.

[0060] For example, while the amount of transparency of oxygen gas and carbon dioxide gas will increase sharply as mentioned

above if many detailed and the crevices where an inside shows compatibility form in a polypropylene film and the aforementioned porosity film is produced, the amount of transparency of a steam increases and transparency of water and various germs is prevented. Therefore, the packing material formed from the aforementioned porosity film can suppress that penetrate the carbon dioxide gas which could penetrate oxygen gas and was generated by respiration of the aforementioned garden stuff, and carbon-dioxide-gas concentration becomes superfluous, and can penetrate the steam which causes dew condensation further. Consequently, the packing material which consists of the aforementioned porosity film has the outstanding garden stuff freshness maintenance operation.

[0061] (2) For example, many detailed and the porosity films with which the inside continued and formed in the 1st film of the above the crevice which shows compatibility from the 2nd film side of the above can be used for the laminated film which carried out the laminating of the 1st film which consists of polyethylene or polypropylene, and the 2nd film which consists of a polyethylene terephthalate as a packing material for deoxidants of a low price. In addition, the crevice formed in the aforementioned porosity film turns into the penetration section in the aforementioned 2nd film portion.

[0062] That is, the conventional packing material for deoxidants drills many breakthroughs in the bilayer film of a polyethylene-terephthalate film and a polyethylene film by the needle punch method etc., and has structure which carried out the laminating of the Japanese paper to the polyethylene film side of the aforementioned bilayer film. For this reason, the part and price which carry out the laminating of the aforementioned Japanese paper become high. Moreover, if a deoxidant is contained to the aforementioned packing material and the aforementioned packing material is contained to an airtight container with liquefied contents, the aforementioned contents will trespass upon the interior through the breakthrough of the aforementioned packing material, and the hole of Japanese paper. Consequently, there is a problem of degrading the deoxidant contained in the aforementioned packing material.

[0063] It is made a saccate and the packing material for deoxidants is produced so that the 1st film of the above which has the aforementioned residual thin film section may become inside about the aforementioned porosity film. External oxygen passes along much penetration sections of the 2nd film of the above, and such a packing material has the property penetrated by the dissolution of the gas which a film material has in the residual thin film section corresponding to the crevice of the 1st film of the above further, and diffusion.

[0064] Therefore, if a deoxidant is contained to the aforementioned packing material and the high airtight container of gas barrier nature is loaded with the aforementioned packing material with contents, such as confectionery, the oxygen in the aforementioned container will penetrate the aforementioned packing material, and will be absorbed by the aforementioned deoxidant. Consequently, since the atmosphere in the aforementioned container changes into the state where it hardly exists as for oxygen, quality degradation accompanying oxidization of the aforementioned contents can be prevented.

[0065] Moreover, it can prevent that the aforementioned contents trespass upon the interior through the aforementioned packing material, and the aforementioned packing material degrades the deoxidant in it even if the aforementioned contents are liquids, since it has high water permeability-proof. Consequently, the contents of the shape of a liquid and a solid-state can be saved only by preparing some kinds of packing materials for a long period of time.

[0066] (3) Since the amount of transparency of oxygen gas and carbon dioxide gas is controllable by controlling the thickness of the opening width of face of the aforementioned crevice, its number, and the aforementioned residual thin film section, the aforementioned porosity film can be used as an oxygen gas filter or a carbonic acid gas filter.

(4) Many detailed and the porosity films with which the inside formed the crevice which shows compatibility can be used for an organic system film, for example, an elastomer film, at the elasticity base film of a ****** agent.

[0067] That is, a ****** agent is stuck on the skin and used for the purpose of resolution or secrete absorption. The thing of the structure which applied to cloth the paste-like medicine for external application which contains dry chemicals conventionally as the aforementioned ****** agent is known. However, as for the ****** agent of such structure, the aforementioned cloth does not fully penetrate a steam. For this reason, if it is used at the time of ****, sticking the aforementioned ****** agent on the skin, the sweat generated from the skin will pile up as it is, without penetrating the aforementioned ****** agent, and will give displeasure.

[0068] The ****** agent which applied the medicine for external application to the aforementioned porosity film has steam permeability with the expensive aforementioned porosity film. For this reason, the aforementioned ****** agent penetrates the sweat generated from the skin, can vaporize good, and can be used good also in the time of ****.

[0069] (5) The porosity film which formed many detailed crevices in the elastomer film explained above (4) does not penetrate water, bacteria, and various germs, but can increase the amount of transparency of a steam, and has still higher elasticity. For this reason, it can use as a glove for an operation.

[0070] moreover -- according to the manufacturing installation mentioned above -- a long film -- receiving -- the property (for example, transparency --) of film material original It has the detailed opening width of face arbitrarily chosen in sub mum-300micrometer, without spoiling most of intensity, a soft feeling, etc. And while an inside can form the crevice which shows compatibility by uniform and a large number (for example, per [1cm2] 500-200,000 pieces) Since the breakthrough with which have a small path compared with the aforementioned opening width of face in the residual thin film section of the aforementioned film located in the aforementioned crevice pars basilaris ossis occipitalis, and an inside indicates compatibility to be can be punched, The porosity film which has the outstanding wettability, and suppresses or prevents transparency for water, bacteria, and various germs, penetrates gas and steams, such as oxygen gas and carbon dioxide gas, and has the controllability of the amount of gas transparency and the amount of steam transparency etc. can be manufactured. Such a porosity film can be used effective in

various packing materials, such as a base film for application film formation mentioned above, a film for laminatings or a packing material for garden stuff freshness maintenance, and a packing material for deoxidants, the elasticity base film of a ****** agent, the glove for an operation, etc.

[0071] Especially the polyethylene film used as a packing material for garden stuff freshness maintenance, a biaxial-stretching polypropylene film, a polypropylene film, a polyethylene-terephthalate film (OPP film), etc. have extremely few amounts of steam transparency compared with an elastomer film or a polyurethane film essentially. By forming the breakthrough connected with many the detailed crevices and the aforementioned crevice partes basilaris ossis occipitalis which perform punching and corona discharge processing to such an organic system film by the manufacturing installation concerning this invention, and show compatibility to the aforementioned film, respectively Many detailed and the porosity films which increased the amount of transparency of a steam sharply since the aforementioned inside which adhered to the crevice where an inside shows compatibility, and was punched at the aforementioned residual thin film section was spread through the breakthrough which shows compatibility of the aforementioned organic system film can be manufactured for the contacted steam. For example, compared with a biaxial-stretching polypropylene film with the unsettled porosity film which formed the aforementioned crevice and the breakthrough in the biaxial-stretching polypropylene film, the amount of steam transparency increases by about 3 figures. Consequently, the aforementioned porosity film can be effectively used as a packing material for garden stuff freshness maintenance which can prevent effectively generating of the cloudiness by the steam and dew condensation.

[0072] Furthermore, in the aforementioned porosity film, the mean free path of the gas which is going to penetrate the aforementioned breakthrough is controllable the opening width of face of the aforementioned crevice, the number of these crevices, the path of the breakthrough (for example, cylindrical shape-like breakthrough) formed in the thickness of residual thin film **** of the aforementioned film and the aforementioned residual thin film section which are located in the aforementioned crevice pars basilaris ossis occipitalis, and by especially controlling the thickness of the aforementioned residual thin film ****, and the path of the aforementioned breakthrough. It can use as the result, for example, the oxygen gas filter which penetrates only the oxygen gas in air alternatively, or a carbonic acid gas filter which penetrates only carbon dioxide gas alternatively.

[0073] Furthermore, if operation of punching and corona discharge processing which were mentioned above using a press means to have the size of a final product (for example, packing material of a deoxidant and a drying agent) in the manufacturing installation of porosity IRUMU concerning this invention and to have the electrode object of a small size comparatively is performed, the smooth precision of the field where it adhered to the synthetic-diamond particle of aforementioned a large number in the aforementioned electrode object of the aforementioned press means can be raised. Consequently, since it is remarkably highly precise and the opposite distance (crevice) of the dielectric layer of the aforementioned pedestal and the aforementioned electrode object of the aforementioned press means at the time of the pressurization of the aforementioned organic system film can be set up, while being able to punch many crevices where the depth was equal to the aforementioned organic system film with sufficient repeatability, the inside of the aforementioned crevice can be affinity--ization-processed good, and it is **. Therefore, the porosity laminated film which can be used for the very quality packing material for deoxidants and the packing material for drying agents can be obtained by applying to the laminated film explained by (2) which mentioned above operation of such punching and corona discharge processing.

[0074] Furthermore, if it is made the structure equipped with the electrode object which adhered the nature of a large number with high degree of hardness and intensity, or the composite diamond particle according to electrodeposition as the aforementioned press means in the manufacturing installation of the porosity film concerning this invention, it can continue at a long period of time, and punching to the aforementioned long organic system film and corona discharge processing can be performed stably. And since the nature of aforementioned a large number or a composite diamond particle can be firmly stuck to the aforementioned electrode object, the press means which was excellent in endurance is realizable. If the aforementioned electrode object is especially formed in the aforementioned pedestal and the field which counters from the copper or the copper alloy of right electrical-and-electric-equipment conductivity with which nickel plating layer was covered, the aforementioned nature or a composite diamond particle can be electrodeposited still more firmly with the aforementioned electrode object, and the press means which was remarkably excellent in endurance can be realized.

[0075] Furthermore What the field where it adhered to the aforementioned synthetic-diamond particle as the aforementioned press means in the manufacturing installation of porosity IRUMU concerning this invention equipped with the electrode object which has a curved-surface configuration corresponding to the organic system film (for example, half-finished products of the shoes which consist of a layered product of synthetic leather and a nonwoven fabric) which has a final-product size is used. And if what has the configuration which agrees with the curved surface of the electrode object of the aforementioned press means as the aforementioned pedestal is used, the porosity film of the final-product size which has moisture permeability can be manufactured.

[0076] Furthermore, the supply means for supplying a long film according to the manufacturing installation of another porosity film concerning this invention, A press means by which it adhered in the field where the particle of with a Mohs hardness of five or more a large number which are arranged free [movement] so that the aforementioned long film may be pressurized between the pedestal by which the aforementioned long film is passed, and the aforementioned pedestal, and have a sharp corner counters with the aforementioned pedestal, By providing the driving means for moving the aforementioned press means to the aforementioned pedestal without it spoils most of the property of film material original to the long film which consists of various material including polymeric materials and a metal -- sub mum- the uniform breakthrough of about ten-micrometer a large number can be formed uniformly continuously at high density (per [1cm2] 5000-200000 pieces)

[0077] That is, the aforementioned press means is moved to the aforementioned pedestal by the aforementioned driving means,

and the aforementioned long film located between the aforementioned press means and the aforementioned pedestal is pressurized by the desired pressure. Since it adheres to the aforementioned pedestal of the aforementioned press means, and the particle (for example, synthetic-diamond particle) of with a Mohs hardness of five or more a large number which have a sharp corner in the field which counters, the sharp corner of the synthetic-diamond particle of aforementioned a large number eats into the aforementioned film, and mechanical punching is made. At this time, by covering the buffer coat which becomes the aforementioned pedestal front face from silicone rubber etc., the sharp corner of many synthetic-diamond particles penetrates the aforementioned film, and mechanical punching is made. Consequently, a non-breakthrough can be uniformly formed in the aforementioned long film. concrete -- sub mum- the breakthrough of the detailed size arbitrarily chosen in about ten micrometers can be formed by uniform and high density (per [1cm2] 5000-200000 pieces) And since the aforementioned punching operation is made according to the mechanical force by the synthetic-diamond particle to which the aforementioned press means adhered, it can form many uniform non-breakthroughs of a detailed size in the aforementioned long film for spoiling-most properties of aforementioned film material original ****. after performing such punching operation, it is made to move so that the aforementioned press means may be separated from the aforementioned pedestal by the aforementioned driving means, and the aforementioned long film is corresponded to the width of face (the length of the side which meets in the move direction of the aforementioned long film) of the aforementioned press means -- length movement is carried out and the same punching operation is carried out again

[0078] Cultivation therefore, the manufacturing installation of this invention -- a polymeric-materials film and a laminated film -- sub mum- uniform and the mushroom mentioned above the breakthrough of the detailed size chosen arbitrarily in about ten micrometers by forming by high density (per [1cm2] 5000-200000 pieces) The porosity polymeric-materials film and porosity laminated film which can be effectively used for cultivation of various bacilli as a useful biotechnology related packing material, various kinds of garments materials, and a packing material for disposable Cairo can be manufactured. moreover, the electromagnetism which has permeability when it applies to the long film which consists of a metal -- the porosity film for a shield etc. can be manufactured

[0079]

[Example] Hereafter, the example of this invention is explained in detail with reference to a drawing.

Example 1 [0080] The outline cross section in which drawing 1 shows the manufacturing installation of the porosity film of this example 1, the perspective diagram which looked at drawing 2 from the undersurface side of the press mechanism in which it is used for the manufacturing installation of drawing 1 , and drawing 3 are the important section cross sections showing the state where the manufacturing installation of drawing 1 punches a non-breakthrough.

[0081] The pedestal 1 consists of supporting plates 3 of A4 size which was laid under the upper part of a bed 2 and this bed 2 and which consists of iron, for example. For example, four supports 4 are set up on the aforementioned bed 2. The support plate 5 is being fixed on four aforementioned supports 4. The pneumatic cylinder 7 which has a piston rod 6 was supported by the aforementioned support plate 5, and the aforementioned piston rod 6 has extended caudad through the hole 8 punctured by the aforementioned support plate 4.

[0082] For example, the press mechanism 9 of A4 size which consists of iron is attached in the soffit of the aforementioned piston rod 6 free [attachment and detachment]. The synthetic-diamond particle 10 which is a with a Mohs hardness [of a large number which have a sharp corner as shown in drawing 2 and drawing 3] of five or more particle is electrodeposited through the electrodeposted layer 11 by the aforementioned supporting plate 3 of the aforementioned press mechanism 9, and the field which counters. The aforementioned synthetic-diamond particle has the particle size of 50-60 micrometers, and is electrodeposited by the field of the aforementioned press mechanism 9 at 70% or more of rate of area.

[0083] The supply roll (not shown) as a long film supply means which carries out an intermittent control action is arranged at the preceding paragraph of the aforementioned supporting plate 3. The long film 12 of the aforementioned supply roll is supplied along the supporting-plate 3 aforementioned upper surface via two delivery rolls 13a and 13b, and is further wound around a winding roll (not shown) via two delivery rolls 14a and 14b of the supporting-plate 3 aforementioned latter part. Next, an operation of the manufacturing installation of the porosity film of composition of having mentioned above is explained.

[0084] From the winding roll (not shown) to first, the long film 12 (for example, by the width of face equivalent to the width of face of A4 size) The long 2 shaft centrifugal polypropylene (OPP) film whose thickness is 20 micrometers Two delivery roll 13a, It supplies along the supporting-plate 3 aforementioned upper surface via 13b, and the nose of cam of the aforementioned long film 12 is further wound around a winding roll (not shown) via two delivery rolls 14a and 14b of the supporting-plate 3 aforementioned latter part.

[0085] After rolling round the nose of cam of the aforementioned long film 12 on a winding roll, to the supporting-plate 3 aforementioned upper surface, the aforementioned pneumatic cylinder 7 is operated, the aforementioned piston rod 6 is moved caudad, the aforementioned press mechanism 9 attached in the piston rod 6 aforementioned soffit is turned to the aforementioned supporting plate 3, and it opens, and the electrodeposted field of the aforementioned synthetic-diamond particle 10 of the aforementioned press mechanism 9 moves a fixed crevice so that it may be located. The aforementioned long film 11 located between the aforementioned supporting plate 3 and the aforementioned press mechanism 9 is pressurized and punched by movement in such a lower part of the press mechanism 9.

[0086] That is, if the aforementioned long film 12 located between the aforementioned supporting plate 3 and the aforementioned press mechanism 9 is pressurized, since the synthetic-diamond particle 10 which has a sharp corner in the aforementioned supporting plate 3 of the aforementioned press mechanism 9 and the field which counters is electrodeposited, as shown in

drawing 3 , the sharp corner of the synthetic-diamond particle 10 of aforementioned a large number eats into the aforementioned long film 12 in regularity depth, and mechanical punching is made. Consequently, the non-breakthrough 16 of a large number in which the super-thin film portion 15 which is equivalent to the aforementioned long film 12 in the aforementioned crevice (h) remained is formed uniformly.

[0087] after performing the aforementioned punching operation, the aforementioned pneumatic cylinder 7 is operated, the aforementioned press mechanism 9 is raised, and the aforementioned long film 12 is corresponded to the width of face (the length of the side which meets in the move direction of the aforementioned long film 12) of the aforementioned press mechanism 9 -- length movement is carried out and the same punching operation is carried out again

[0088] In A4 size which started the aforementioned long film portion pressurized between the aforementioned supporting plate 3 and the aforementioned press mechanism 9, and was obtained, the configuration and density of a non-breakthrough were measured about the 20-micrometer porosity OPP film in thickness. Consequently, in the aforementioned porosity OPP film, the non-breakthrough of the detailed size of 20 micrometers of diameters of opening is 2 about 10000 pieces/cm. The thickness of the a large number and residual [corresponding to / it is punched uniformly and / the aforementioned sheep breakthrough] super-thin film section was 2 micrometers by density. Moreover, the aforementioned porosity OPP film had the amount of steam transparency of RH 1.0x105 -2.0x105 cc/m2 and 24hr, amount [of 23 degrees C] of oxygen transparency and 8 - 10 g/m2, 24hr, 40 degree C, and 90%. Therefore, it was able to use the aforementioned porosity OPP film effectively that the amounts of oxygen transparency are 6000-20000 cc/m2 and 24hr, and 23 degrees C as a packing material for garden stuff freshness maintenance demanded.

Example 2 [0089] A long laminated film with a width of face of 200mm which carried out the laminating of the polyethylene-terephthalate (PET) film with a thickness of 12 micrometers to the polyethylene (PE) film with a thickness of 30 micrometers through adhesives as a long film 12 is used. It supplied on the aforementioned supporting plate 3, and the same operation as an example 1 punched so that it might be arranged at the synthetic-diamond particle electrodeposition side side of the press mechanism which the aforementioned PET film mentioned above, using a thing with a width of face [of 200mm], and a length of 200mm as the aforementioned supporting plate 3 and the aforementioned press mechanism 9.

[0090] The porosity laminated film (size;200mmx 200mm) which started the aforementioned long laminated-film portion pressurized between the aforementioned supporting plate and the aforementioned press mechanism, and was obtained covers the aforementioned PE film from the aforementioned PET film side, and the detailed non-breakthrough of 20 micrometers of diameters of opening is 2 about 10000 pieces/cm. The thickness of the a large number and residual [corresponding to / it is punched uniformly and / the aforementioned sheep breakthrough] super-thin film section was 3-5 micrometers by density. Such a porosity laminated film had high water pressure-proof nature (water permeability-proof), and since it had oxygen and steam permeability, it has been effectively used as the packing material for drying agents, and a packing material for deoxidants.

The outline cross section in which example 3 drawing 4 shows the manufacturing installation of the porosity film of this example 3, and drawing 5 are the perspective diagrams showing the press mechanism in which it is used for the manufacturing installation of drawing 4 .

[0091] The pedestal 21 consists of iron supporting plates 3 laid under the upper part of a bed 22 and this bed 22, for example. The aforementioned supporting plate 23 has the same width of face and same length as the long laminated film whose width of face mentioned later is 200mm. The dielectric layer 24 with a thickness of 3mm it is thin from an alumina is covered by the supporting-plate 23 aforementioned upper surface. For example, four supports 25 are set up on the aforementioned bed 22. The support plate 26 is being fixed on four aforementioned supports 25. The pneumatic cylinder 28 which has a piston rod 27 was supported by the aforementioned support plate 26, and the aforementioned piston rod 27 has extended caudad through the hole 29 punctured by the aforementioned support plate 25.

[0092] The press mechanism 30 is attached in the soffit of the aforementioned piston rod 27 free [attachment and detachment]. The aforementioned press mechanism 30 has the following structures. That is, as shown in drawing 5 , the aforementioned press mechanism 30 is equipped with the iron main part 32 of a press with which the band-like crevice 31 was formed in the inferior surface of tongue, and is. The electric insulating plate 35 which has the band-like crevice 34 and which consists of polycarbonate resin, for example is being fixed to the upper surface by the band-like heights 33 and the inferior surface of tongue in one through adhesives etc. on the inferior surface of tongue of the aforementioned main part 32 of a press. It was fixed to the crevice 34 of the aforementioned electric insulating plate 35 through adhesives etc., and the copper electrode board 36 is projected in predetermined height from the inferior surface of tongue of the aforementioned electric insulating plate 35. The aforementioned electrode board 36 has the same width of face and same length as width of face of the long laminated film mentioned later. The synthetic-diamond particle 37 which is a with a Mohs hardness [of a large number which have a sharp corner like the example 1 mentioned above] of five or more particle is electrodeposited through the electrodeposted layer by the aforementioned supporting plate 23 of the aforementioned electrode board 36, and the field which counters. The aforementioned synthetic-diamond particle has the particle size of 70-85 micrometers, and is electrodeposited by the field of the aforementioned electrode board 36 at 70% or more of rate of area.

[0093] The aforementioned electric insulating plate 35 is penetrated from the main part 32 of a press of the aforementioned press mechanism 30, and the electrode-terminal extraction hole 38 is drilled. For example, the insulating barrel 39 which consists of polycarbonate resin is inserted so that it may project from the main part 32 aforementioned front face in the aforementioned hole 38. The high-voltage-supply terminal 40 is inserted in the aforementioned insulating barrel 39, and the nose of cam of the aforementioned terminal 40 is connected to the aforementioned electrode board 36 exposed to the hole 38 aforementioned base.

The source of a high voltage supply (not shown) is connected to the back end of the aforementioned terminal 40 through the cable, respectively. By supplying the high voltage to the aforementioned terminal 40 with which it insulated by each aforementioned insulating barrel 39 to the aforementioned main part 32 of a press through the cable from the aforementioned source of a high voltage supply, the high voltage is supplied only to the aforementioned electrode board 36.

[0094] The supply roll (not shown) as a long laminated-film supply means which carries out an intermittent control action is arranged at the preceding paragraph of the aforementioned supporting plate 23. The long laminated film 41 of the aforementioned supply roll is supplied along with the dielectric layer 24 of the supporting-plate 23 aforementioned upper surface via two delivery rolls 42a and 42b, and is further wound around a winding roll (not shown) via two delivery rolls 43a and 43b of the supporting-plate 23 aforementioned latter part. Next, an operation of the manufacturing installation of the porosity film of composition of having mentioned above is explained.

[0095] From the winding roll (not shown) to first, the long laminated film 41 (for example, width of face of 200mm) The long laminated film to which thickness carried out the laminating of the nonwoven fabric which is 200 micrometers to the polyethylene film with a thickness of 20 micrometers through adhesives by this width of face Two delivery roll 42a, Along with the dielectric layer 24 of the aforementioned supporting plate 23, it supplies via 42b, and the nose of cam of the aforementioned long film 41 is further wound around a winding roll (not shown) via two delivery rolls 43a and 43b of the supporting-plate 23 aforementioned latter part.

[0096] After rolling round the nose of cam of the aforementioned long laminated film 41 on a winding roll, the aforementioned pneumatic cylinder 28 is operated, the aforementioned piston rod 27 is moved caudad, the aforementioned press mechanism 30 attached in the piston rod 27 aforementioned soffit is turned and moved to the aforementioned supporting plate 23, and the aforementioned long laminated film 41 located between the electrode board 36 of the aforementioned press mechanism 30 and the dielectric layer 24 of the supporting-plate 23 aforementioned upper surface is pressurized. Simultaneously, for example, the alternating current high voltage is supplied to the aforementioned electrode board 36 of the aforementioned press mechanism 30 through a cable and the aforementioned high-voltage-supply terminal 40 from the source of a high voltage supply (not shown), and the synthetic-diamond particle electrodeposited by the aforementioned supporting plate 23 of the aforementioned electrode board 36 and the field which counters is supplied. Those insides are affinity--ization-processed while many crevices are punched at the aforementioned long laminated film 41 supplied by such processing between the aforementioned supporting plate 23 and the electrode object 36 of the aforementioned press mechanism 30.

[0097] That is, the aforementioned press mechanism 30 has structure which the synthetic-diamond particle 37 of a large number which have a sharp corner in an opposite side with the aforementioned supporting plate 23 equipped with the copper electrode object 36 to which it adhered through the electrodeposted layer at 70% or more of rate of area, as shown in drawing 4 . Moreover, the aforementioned supporting plate 23 has structure with which the dielectric layer 24 was covered by the front face. For this reason, if the aforementioned long laminated film 41 is pressurized between the aforementioned supporting plate 23 and the electrode object 36 of the aforementioned press mechanism 30, the corner of many synthetic-diamond particles 37 of the aforementioned electrode object 36 will eat into the aforementioned long laminated film 41 uniformly, mechanical punching will be made, and the crevice of the shape of much reverse cone will be formed. Simultaneously, since the aforementioned electrode object 36 of the aforementioned press mechanism 30 in which the alternating current high voltage was supplied has countered the supporting plate 23 with which the dielectric layer 24 was covered by the front face on both sides of the aforementioned long laminated film 41, corona discharge generates it uniformly between the corner of the synthetic-diamond particle 37 of a large number which are the dielectrics of the electrode object 36 aforementioned front face, and the dielectric layer 24 of the aforementioned supporting plate 23. In such corona discharge, if the low direct-current high voltage is comparatively supplied to the aforementioned synthetic-diamond particle 37 from the aforementioned source of a high voltage supply, since the low corona of energy will be comparatively irradiated uniformly by the aforementioned long laminated film 41 into which the aforementioned synthetic-diamond particle 37 ate, the inside of the crevice of a large number punched at the aforementioned long laminated film 41 is affinity--ization-processed by the aforementioned corona discharge.

[0098] after performing the aforementioned punching operation, the aforementioned pneumatic cylinder 28 is operated, the aforementioned press mechanism 30 is raised, and the aforementioned long laminated film 41 is corresponded to the width of face (the length of the side which meets in the move direction of the aforementioned long laminated film 41) of the aforementioned press mechanism 30 -- length movement is carried out and the same punching operation is carried out again

[0099] Therefore, according to the porosity film manufacturing installation mentioned above Since mechanical uniform punching and mechanical uniform corona discharge of the synthetic-diamond particle 37 by the sharp corner of a large number to which electrode object 36 front face of the press mechanism 30 adhered are made to the field of the aforementioned long laminated film 41 corresponding to the aforementioned electrode object 36, the aforementioned long laminated film 41 -- the property (for example, transparency --) of aforementioned film material original Without spoiling most soft feelings etc., it has the detailed opening width of face arbitrarily chosen in sub mum-300micrometer, and an inside can form the crevice which makes the shape of a reverse cone which shows compatibility by uniform and a large number (for example, per [1cm2] 500 - 200,000 pieces). Since it had good oxygen permeability, such a porosity laminated film was able to be used as it was as a packing material of disposable Cairo. On the other hand, if the comparatively high alternating current high voltage is supplied to the aforementioned electrode object 36 of the aforementioned press mechanism 30 through a cable and the high-voltage-supply terminal 40 in the aforementioned example 3 from the aforementioned source of a high voltage supply When many synthetic-diamond particles 37 to which the aforementioned electrode object 36 adhered eat away The corona of a high energy mainly concentrates on the residual

thin film section located in the pars basilaris ossis occipitalis of the crevice formed in the aforementioned long laminated film 41 by the edge effect in the corner of the aforementioned synthetic-diamond particle 37, it irradiates, and punching is made. For this reason, the breakthrough of the shape of a cylindrical shape of a path smaller than the opening width of face of the aforementioned crevice is formed in the aforementioned residual thin film section. Moreover, the inside of the crevice of a large number punched at the aforementioned long laminated film 41 and the inside of the aforementioned breakthrough are affinity--ization-processed by the aforementioned corona discharge. Consequently, many (for example, 10,000 piece/cm2) crevices which have the detailed opening width of face (for example, about 20 micrometers) an inside indicates compatibility to be to the aforementioned long laminated film 41 are formed. And the long porosity organic system film with which the breakthrough of the shape of a pillar located in the pars basilaris ossis occipitalis of each aforementioned crevice which an inside shows compatibility to the residual thin film section with an average thickness of about 5 micrometers, for example, and has a path (for example, 3.5 micrometers) smaller than the opening width of face of the aforementioned crevice was punched can be obtained.

Example 4 drawing 6 is the outline cross section showing the manufacturing installation of the porosity film of this example 4.

[0100] The pedestal 51 consists of supporting plates 53 which were laid under the upper part of a bed 52 and this bed 52 and which consist of iron, for example. The aforementioned supporting plate has the same width of face and same length as width of face of the long laminated film mentioned later. For example, the buffer coat 54 with a thickness of 3mm it is thin from silicone rubber is covered by the supporting-plate 53 aforementioned upper surface. For example, four supports 55 are set up on the aforementioned bed 52. The support plate 56 is being fixed on four aforementioned supports 55. The pneumatic cylinder 58 which has a piston rod 57 was supported by the aforementioned support plate 56, and the aforementioned piston rod 57 has extended caudad through the hole 59 punctured by the aforementioned support plate 56.

[0101] For example, the press mechanism 60 which consists of iron is attached in the soffit of the aforementioned piston rod 57 free [attachment and detachment]. The aforementioned press mechanism 60 has the same width of face and same length as width of face of the long laminated film mentioned later. The synthetic-diamond particle 61 which is a with a Mohs hardness [of a large number which have a sharp corner as shown in drawing 2 and drawing 3 which were mentioned above] of five or more particle is electrodeposited through the electrodeposted layer by the aforementioned supporting plate 3 of the aforementioned press mechanism 60, and the field which counters. The aforementioned synthetic-diamond particle 61 has the particle size of 70-85 micrometers, and is electrodeposited by the predetermined field of the aforementioned press mechanism 60 at 70% or more of rate of area.

[0102] The supply roll (not shown) as a long laminated-film supply means which carries out an intermittent control action is arranged at the preceding paragraph of the aforementioned supporting plate 53. The long laminated film 62 of the aforementioned supply roll is supplied along with the buffer coat 54 of the supporting-plate 53 aforementioned upper surface via two delivery rolls 63a and 63b, and is further wound around a winding roll (not shown) via two delivery rolls 64a and 64b of the supporting-plate 53 aforementioned latter part.

[0103] From the winding roll (not shown) to first, the long laminated film 62 (for example, width of face of 200mm) The long laminated film to which thickness carried out the laminating of the nonwoven fabric which is 250 micrometers to the polyethylene film with a thickness of 20 micrometers through adhesives by this width of face Two delivery roll 63a, Along with the buffer coat 54 of the aforementioned supporting plate 53, it supplies via 63b, and the nose of cam of the aforementioned long laminated film 62 is further wound around a winding roll (not shown) via two delivery rolls 64a and 64b of the supporting-plate 53 aforementioned latter part.

[0104] It is the aforementioned long laminated film 62 which operates the aforementioned pneumatic cylinder 58, make move the aforementioned piston rod 57 caudad, make turn and move the aforementioned press mechanism 60 attached in the piston rod 57 aforementioned soffit to the buffer coat 54 of the supporting-plate 53 aforementioned upper surface, and is located between the aforementioned press mechanism 60 and the buffer coat 54 of the supporting-plate 53 aforementioned upper surface after rolling round the nose of cam of the aforementioned long laminated film 62 on a winding roll. 100 kg/cm2 It pressurizes at a pressure. Thus, if the aforementioned long laminated film 62 located between the buffer coat 54 of the aforementioned supporting plate 53 and the aforementioned press mechanism 60 is pressurized, since the synthetic-diamond particle 61 which has a sharp corner in the aforementioned buffer coat 54 of the aforementioned press mechanism 60 and the field which counters is electrodeposited, the sharp corner of the synthetic-diamond particle 61 of aforementioned a large number eats into the aforementioned long laminated film 62, and mechanical punching attained up to the buffer-coat 54 aforementioned front face is made. Consequently, many breakthroughs are uniformly formed in the aforementioned long laminated film 62.

[0105] after performing the aforementioned punching operation, the aforementioned pneumatic cylinder 58 is operated, the aforementioned press mechanism 60 is raised, and the aforementioned long laminated film 62 is corresponded to the width of face (the length of the side which meets in the move direction of the aforementioned long laminated film 62) of the aforementioned press mechanism 60 -- length movement is carried out and the same punching operation is carried out again

[0106] the porosity laminated film (size;200mmx 200mm) which started the long laminated-film 62 aforementioned portion pressurized between the buffer coat 54 of the aforementioned supporting plate 53, and the aforementioned press mechanism 60, and was obtained -- the aforementioned PE film -- the detailed breakthrough of 10 micrometers of diameters of opening -- about 10000 -- piece/cm2 density -- a large number -- and it was punched uniformly Since it had good oxygen permeability and good moisture permeability (600-800g/cm2 and 24hr), such a porosity laminated film was able to be used as it was as a packing material of disposable Cairo.

[0107]

[Effect of the Invention] As explained in full detail above, according to the manufacturing installation of the porosity film concerning this invention the long film which consists of various material including polymeric materials -- receiving -- the property (for example, a soft feeling --) of film material original Many the uniform breakthroughs or the non-breakthroughs of a detailed size which were arbitrarily chosen in about ten micrometers can be formed by uniform and high density (per [1cm2] 5000-200000 pieces). without it spoils most transparency -- sub mum- As a result, the packing material of a deoxidant, a drying agent, and disposable Cairo, the packing material for garden stuff freshness maintenance, Remarkable effects -- a porosity film useful as materials, such as a biotechnology related packing material useful to cultivation of a mushroom and cultivation of various bacilli, hygienic goods represented by the disposable disposable diaper, medical material, and garments, can be manufactured -- are done so.

[0108] According to the manufacturing installation of the porosity film concerning this invention, moreover, polymeric materials, various kinds of long films including a laminated material -- receiving -- the property (for example, transparency --) of film material original It is arbitrarily chosen in sub mum-300micrometer, without spoiling most of a soft feeling, intensity, etc. And a large number (for example, per [1cm2] 500 - 200,000 pieces) can be formed. an inside is uniform respectively in the breakthrough of a path smaller than the opening width of face of the aforementioned crevice connected with the detailed crevice and the aforementioned crevice which show compatibility at a pars basilaris ossis occipitalis -- Remarkable effects -- a porosity film suitable as materials, such as functional films (especially various kinds of gas filters, packing material for garden stuff freshness maintenance), such as a base film for application film formation, various kinds of gas filters, a medical material, and a packing material for garden stuff freshness maintenance, can be manufactured -- are done so.

[Translation done.]